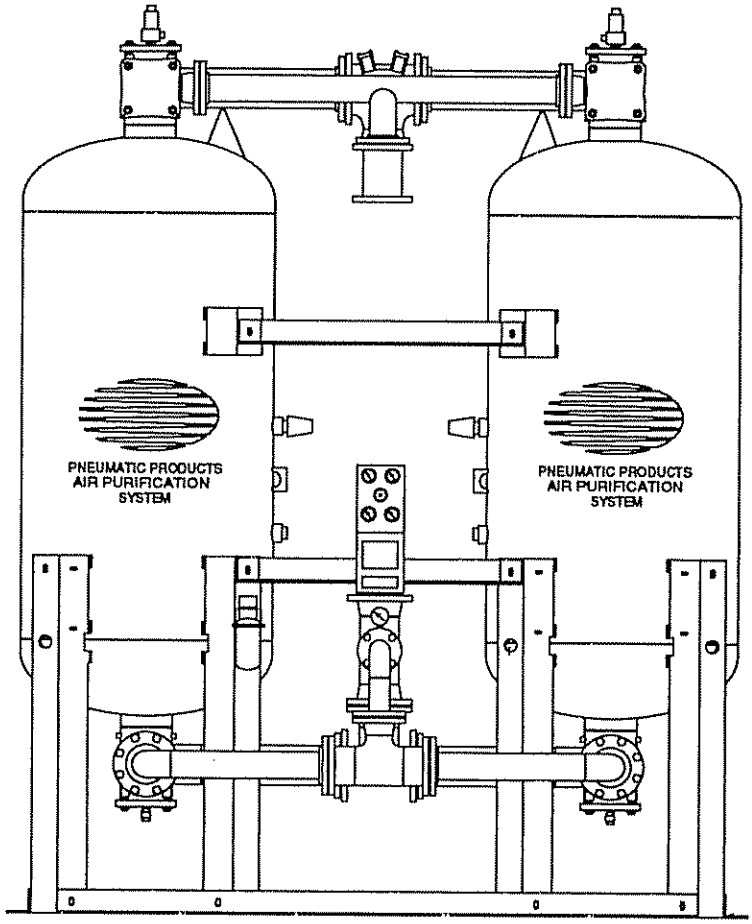
CHA DRYER

Models 1600 Through 12100



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A WORD TO PNEUMATIC PRODUCTS CORPORATION (PPC) AIR/GAS PURIFICATION SYSTEM OWNERS

This manual has been prepared to acquaint you with the installation, operation and maintenance of your Pneumatic Products Corporation (PPC) Air or Gas Dryer, and to provide important safety information. We urge you to read this data carefully. Follow the recommendations to help insure the highest performance, safe and trouble free operation of your Air Purification System.

When it comes to Service, remember that your Local PPC Sales Representative knows your equipment and is interested in your complete satisfaction. To help handle your needs, most of these Sales Companies have become Authorized PPC Service Centers. Please contact the office listed inside your dryer control box when you need parts or service assistance. If you have a problem that has not been handled to your satisfaction, follow the steps outlined in Field Service Information and Assistance , Section 1.3 of this manual.

We thank you for choosing a Pneumatic Products Corporation (PPC) product and want to assure you of our continuing dedication to provide the highest air purification equipment reliability and performance available anywhere in the world.

CAUTION

STATIC SENSITIVE DEVICES

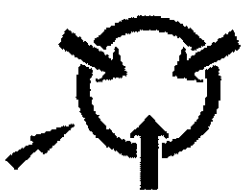
STATIC SENSITIVE DEVICES CAN BE DAMAGED BY ELECTROSTATIC DISCHARGE. YOU CAN MINIMIZE THE CHANCES OF DESTROYING SUCH DEVICES BY:

1. KNOWING THAT THERE IS A POTENTIAL STATIC SENSITIVE PROBLEM.
2. ADHERING TO THE GUIDELINES LISTED BELOW FOR HANDLING THEM.
3. USING RECOMMENDED PACKAGING AND BENCH TECHNIQUES.

FOLLOW THESE PRACTICES TO MINIMIZE DAMAGE TO STATIC SENSITIVE DEVICES.

1. DO NOT WELD ON THIS EQUIPMENT AND/OR ASSOCIATED PIPING. THE CONTROL IS SENSITIVE TO ELECTRICAL GROUND LOOP VOLTAGES.
2. DISCHARGE PERSONAL STATIC BEFORE HANDLING DEVICE. (USE GROUNDING WRIST STRAP.)
3. MINIMIZE HANDLING.
4. HANDLE STATIC SENSITIVE DEVICES BY THE BODY ONLY. DO NOT TOUCH ANY CONNECTORS. (USE MICRO-CHIP EXTRACTION AND INSERTION TOOLS.)
5. KEEP PARTS IN ORIGINAL CONTAINERS UNTIL READY FOR USE.
6. DO NOT SLIDE STATIC SENSITIVE DEVICE OVER ANY SURFACE.
7. USE ANTI-STATIC CONTAINERS FOR HANDLING AND TRANSPORT.
8. KEEP PLASTIC, VINYL AND POLYSTYRENE FOAM OUT OF THE WORK AREA.
9. WHEN REMOVING ASSEMBLIES HANDLE ONLY BY NON-CONDUCTIVE EDGES AND NEVER TOUCH OPEN CONNECTORS EXCEPT AT A STATIC FREE WORK STATION. PLACING SHORTING STRIPS ON CONNECTOR USUALLY PROVIDES COMPLETE PROTECTION TO INSTALLED STATIC SENSITIVE DEVICES.
10. HANDLE STATIC SENSITIVE DEVICES ONLY AT A STATIC-FREE WORK STATION.
11. USE ONLY ANTI-STATIC TYPE SOLDER-SUCKERS.
12. USE ONLY GROUNDED TIP SOLDERING IRONS.

STATIC SENSITIVE SYMBOL



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1 General Information

1.1 Foreword

This manual is designed to serve as the installation, operation, and maintenance guide for your dryer. The contents of this manual should be carefully read BEFORE attempting any phase of installation, operation or maintenance. Failure to follow the operating and maintenance procedures of the instruction manual could result in personal injury or property damage.

To facilitate maintenance, a "Recommended Spare Parts List" for your specific dryer model has been prepared and attached. Failure to maintain recommended spare parts and filter cartridges may result in EXPENSIVE and unnecessary downtime, for which Pneumatic Products Corporation (PPC) cannot be responsible. To request a quotation, or place an order for recommended or emergency spare parts, please contact your local Pneumatic Products Corporation Sales Representative.

A Dryer Specification Plate has been permanently attached to the front of the dryer. When requesting information, service, ordering of spare parts, etc., please reference all information supplied on the Specification Plate. Refer to the Field Service Information and Assistance Section of this manual for contact procedures.

All information, specifications and illustrations within this manual are those in effect at the time of printing. Pneumatic Products Corporation reserves the right to change or make improvements without incurring any obligation to make changes or add improvements to products previously sold.

1.2 Warranty Policy

The following clearly defines the Pneumatic Products Corporation (PPC) Warranty Policy. PPC management is solely responsible for establishing service rates and determining the disposition of warranty claims. Approval for deviation from this policy must have prior approval of PPC management.

1.2.1 Warranty

Pneumatic Products Corporation products are rigidly inspected throughout the manufacturing process. Our products are warranted for a period of one year from date of shipment against defective materials and workmanship when properly installed and operated within design conditions. All parts proven to be defective within this period will be replaced free of charge, with all shipment and labor charges paid by customer. Claims for damage or lost labor will not be allowed; nor can we guarantee our equipment against corrosion or similar sources of failure where the operating conditions are beyond our control; nor do we guarantee a minimum length of service on these products.

1.2.2 Extended Warranty

Extended warranty providing 12 months coverage after equipment start-up, not to exceed 18 months from shipment is available under the following condition:

> "Equipment start-up must be performed by factory authorized service personnel, available at standard field service rates. The start-up must be documented and proper notice provided to PPC."

1.2.3 Warranty Replacement Parts Process

It should be noted that the PPC warranty responsibility is limited to furnishing the customer replacement parts at no cost. The customer is responsible for the outward shipping costs.

A customer Purchase Order is required prior to shipment of warranty replacement parts. Replacement parts will be shipped immediately at no charge. The customer is required to return the reportedly defective parts to Ocala, Florida at PPC expense. When the parts are received, inspected, and the defect is confirmed; the customer's P.O.

is considered closed. If no defect is found, the original part will be returned to the customer, freight collect and an invoice against the customer's P.O. will be issued for the replacement part already sent. Returns must be made through the PPC Return Goods Authorization System. Contact the PPC Field Service Department for return authorization.

1.2.4 Warranty Field Service Labor

While the PPC warranty does not cover replacement parts installation; PPC may elect to provide this service at the discretion of PPC management. Prior authorization is required before a service call will be made. A customer Purchase Order is required before a PPC Authorized Service Engineer will make a service call (warranty or paid). After the service call, PPC will determine what charges will be covered by the warranty and what charges will be invoiced to the customer's Purchase Order.

1.2.5 Start-Up Process

Dryer start-up is the responsibility of the local PPC Sales Representative.

PPC requires two (2) weeks notification from the customer or local representative in order to schedule a factory service engineer for a paid start-up call. The local PPC Authorized Service Center may also be contacted to provide paid start-up in order to gain the Extended Warranty Coverage.

In any case, the local PPC Sales Representative is required to be present at all start-ups.

1.3 Field Service Information and Assistance

For information or inquiries concerning dryer installation, operation, maintenance problems or service, contact your local Pneumatic Products Corporation Sales Representative. If your problem is not handled to your satisfaction then contact:

PNEUMATIC PRODUCTS CORP.
4647 S.W. 40th Avenue
Ocala, Florida 32674

ATTENTION: FIELD SERVICE
PHONE: (904) 237-1220
FAX NO: (904) 854-1402

When making inquiries by phone or correspondence, please provide the following information:

1. Dryer Model Number
2. Dryer Serial Number
3. Actual Dryer Inlet Pressure
4. Actual Dryer Inlet Temperature
5. Actual Flow Rate (if known)
6. Approximate Time In Service
7. Nature Of Problem

1.4 Short Shipment or Incorrect Material Claims

All claims for shortage or incorrect material must be made within ten (10) days after its receipt. A shipment often consists of several containers, skids, etc. that include loose accessories such as pipe, filter elements, relief valves, drain valves, and desiccant. Please review all invoices and shipping documents carefully for possible shortages.

1.5 Shipping Damage Claims

Equipment must be carefully inspected immediately upon receipt for possible damage incurred during shipment.

Ownership of equipment shipped F.O.B. Ocala, Florida is transferred to the purchaser upon departure from our factory. Therefore, all shipping claims must be owner-processed with the shipping carrier, and cannot be handled by Pneumatic Products Corporation. We, the manufacturer, will attempt to assist you in every way possible, however, the initial claim and all future proceedings are the responsibility of the owner.

In the event that the equipment has sustained visible external damage or it is suspected that internal damage may have occurred, immediately enter a claim with the shipping carrier and notify Pneumatic Products Corporation. Any indication of damage or careless handling by the carrier should be noted on the delivery receipt. Obtaining the delivery man's signed agreement to any noted damages will facilitate any future insurance claims.

In all cases of damage, visible or suspected, contact your local representative or the factory before attempting to install subject equipment.

1.6 Return Goods Authorization

To ensure that material or equipment being returned for repair or credit is being handled properly, please adhere to the following procedure:

1. Contact the Pneumatic Products Corporation Field Service Department to discuss potential returns. Valid returns will be assigned an authorization number.

2. Mark the outside of each shipping container with the assigned authorization number. If more than one container is returned, please mark each additional container with the assigned authorization number.

3. Return subject equipment or material to Pneumatic Products Corporation unless otherwise directed.

4. Material or equipment shipped to Pneumatic Products Corporation without proper authorization cannot be accepted and will be immediately returned at the customer's expense.

   Note: Return goods authorization does not in itself constitute a guarantee that credit will be issued. Final disposition of credit allowance rests solely with Pneumatic Products Corporation and will be made after receipt and inspection of subject material or equipment.

2 Installation

2.1 Equipment Handling

Note: Should question arise concerning site selection, installation, operation, etc., please contact your local Pneumatic Products Corporation Sales Representative for assistance.

WARNING!
Use appropriate, load-rated lifting equipment, and observe safe lifting procedures during all moves. The unit should be carefully unloaded as close as is possible to final installation site to minimize chances of equipment damage. Refer to the Dryer Specification and Performance Data Sheet for equipment shipping weight.

Forklift slotting at the base of the dryer's protective shipping framework and lifting lugs installed on the dryer are provided for lifting.

2.2 Mechanical Set-Up

IMPORTANT: When selecting an installation site, consideration must be given to the need for adequate clearances around and above the dryer for ease of maintenance and accessibility. Site selection should also take into account possible momentary sound levels in excess of 85 decibels during each desiccant chamber depressurization period.

1. Locate the dryer in an area with adequate clearance for servicing of all components. The recommended circumferential clearance around the dryer should be a minimum of four (4) feet. An overhead clearance of not less than two (2) feet above each desiccant chamber fill port plug is required for desiccant installation. Refer to the Dimension and Connection Drawing for dimension, connection and weight specifications applicable to your specific dryer model.

2. Remove all protective shipping framework, covers, pipe plugs, shipping blocks, etc.

3. Utilizing the baseplate mounting holes provided, anchor the dryer to a solid, level foundation designed to support the dryer's dead weight loading, plus any earthquake or wind loadings, as required.

4. Suitable protective barriers are recommended to reduce the possibility of accidental damage if the unit is located in an open area, or in close proximity to vehicular and pedestrian traffic.

2.3 Equipment Check

1. Vibration during shipment can cause loosening of fittings and fasteners. Therefore, inspect the dryer for alignment, connection and tightness of all subassemblies, etc.

   Note: Amloc Probes when furnished have been shipped unmounted. DO NOT MOUNT AT THIS TIME. They will be installed during initial desiccant installation.

2. Remove shipping plugs from desiccant chamber relief valve ports (2). Apply TFE tape to threads and install relief valves (2) provided.

   Note: Pressure relief valves are normally shipped with other items on an enclosed accessory skid that accompanies the dryer.

3. Desiccant is **not** installed prior to shipment. Refer to the Desiccant Installation Procedure in the Maintenance and Repair section of this manual.

   CAUTION: Dryer models covered within the scope of this manual are designed to use a specific desiccant. Use of any other size or type may reduce efficiency or damage the dryer.

CAUTION: Do not hydrostatically test the dryer with desiccant installed. All pressure vessels are factory tested at one and one-half (1-1/2) times the design pressure. Hydrostatic testing will damage the dryer's desiccant charge.

4. While exercising caution for Static Sensitive Devices, open the Dryer Control System enclosure cover and inspect as follows:

   a) Check all terminal block wiring connections. **Do not overtighten terminal block lug screws.**

   b) Check 3-way solenoid valves "A" through "E" for any loosening which may have occurred during shipment. **Do not overtighten.**

   c) Close the dryer control system enclosure cover and tighten all cover latches.

   CAUTION: Do not remove the factory programmed microcomputer chip or any I.C. chip from the logic control circuit board. Improper removal will cause irreparable damage to these highly static-sensitive components. Damage to these components will render the Dryer Control System inoperative until replacement is accomplished by a Field Service Engineer. **Do not remove the program identification sticker from the microcomputer chip.**

2.4 Piping and Component Installation Notes

Note 1: Use the proper pressure rated piping, fittings and valves as approved by ASME, ANSI, CSA, etc. Separate or special requirements by local and/or municipal codes may also apply.

Note 2: The manufacturer and its affiliates are not liable for code violations, downtime, component failure or consequential damages to customer supplied components and/or equipment.

Note 3: Desiccant gas dryers are designed for removal of **vaporous** moisture ONLY. The installation of a coalescing prefilter assembly (equipped with an automatic drain valve or drain trap) is necessary to protect the dryer's desiccant from oil contamination and liquid moisture. An afterfilter assembly (installed downstream of the dryer), is necessary for the interception of highly abrasive fines which are generated by all desiccant dryers.

Note 4: Where it is undesirable to interrupt process flow, an Adsorber Bypass System with block valves should be installed to permit servicing and maintenance of the dryer and associated filter assemblies. The recommended block valve MUST be of a type which will provide bubble-tight shut-off. Ball, globe, or butterfly valves with soft seats are suitable for this purpose. **Do not use plug or gate valves.**

Note 5: Prefilter and dryer inlet piping must be arranged so that liquids will not accumulate and enter the dryer.

Note 6: All inlet and outlet connections, valving and interconnecting piping **MUST** be of the same size as the dryer's gas inlet connection or larger. Pneumatic Products Corporation and its affiliates are not liable for excessive pressure drops and loss of capacity caused by undersized or incorrectly installed piping and/or piping components. Refer to the Dryer Dimension and Connection Drawing for inlet and outlet connection sizes which are applicable to your specific dryer model.

Note 7: Carefully inspect all piping lengths and components **BEFORE** installation. Remove any internal oil, water, dirt, or debris which may have accumulated during shipment and/or storage.

Note 8: Leakage from piping connections and/or associated components installed upstream of the dryer will cause a loss of gas pressure and unnecessary compressor cycling. The **slightest** leakage from piping connections and/or associated components installed downstream of the dryer's outlet connection can easily cause a degradation of the dried gas dew point. The use of TFE tape on all male pipe threads and the application of sufficient torque at assembly will greatly reduce chances of leakage and subsequent rework.

Note 9: As with any type of equipment (mechanical, electrical, etc.), a probability exists for component malfunction which could adversely affect equipment performance and/or operation. If the System is to be employed in a critical use application where:

   1) Interruption of process flow cannot be tolerated.

   2) Process quality cannot be compromised.

The following recommendations should be considered:

1) Installation of redundant systems to provide a backup supply.

2) Separate source of process gas.

Appropriate block valves (customer supplied) should be installed to prevent back flow or process loss due to out of service or damaged equipment undergoing or waiting repair.

2.5 Piping and Component Installation

Note: FIGURE 2.1 illustrates a recommended piping, filter, and valve installation layout. If your present gas drying system design does not include an oil and water extracting Prefilter Assembly, or particulate removing Afterfilter Assembly, please contact your local PPC Sales Representative directly, for specific information concerning these and other fine PPC products.

IMPORTANT: Prefilter and Afterfilter Assemblies are labeled for easy identification. **Assemblies must be installed as labeled, for proper operation.**

1. Refer to the following sources of information as necessary while conducting piping and component installation procedures:

   a) **Piping and Installation Notes** section of this manual.

   b) Dryer Dimension and Connection Print for dryer dimensions and connection sizes, component identification and location.

   c) Prefilter and Afterfilter Dimension and Connection Prints accompany this manual when filter assemblies have been included with the dryer purchase.

   d) FIGURE 2.1 for recommended valve installation and piping layout.

   e) Purge Exhaust Piping is required.

Piping will be as follows:

PURGE EXHAUST PIPE SIZE		DIMENSIONS ARE INCHES		
PURGE CONNECTION		3	4	6
EQUIVALENT LENGTH OF PIPE IN FT.	10 FT. or LESS	3	4	6
	11 FT. to 25 FT.	3.5	5	8
	26 FT. to 50 FT.	4	6	10
	51 FT. to 100 FT.	5	8	12

Never use more than 100 equivalent feet of pipe.

The Equivalent Length (based on Purge Exhaust Size) of a pipe which will have the same resistance to air flow as the actual pipe run, including all its pipe fittings and valves. A list of fittings and applicable L/D factors for each are shown below:

FITTINGS	L/D
Standard 90 Ell	30
Standard 45 Ell	16
Fully open globe valve	450

To obtain the equivalent length of pipe for each of the fittings shown, multiply the L/D factor by D (the inside diameter of the pipe in feet).

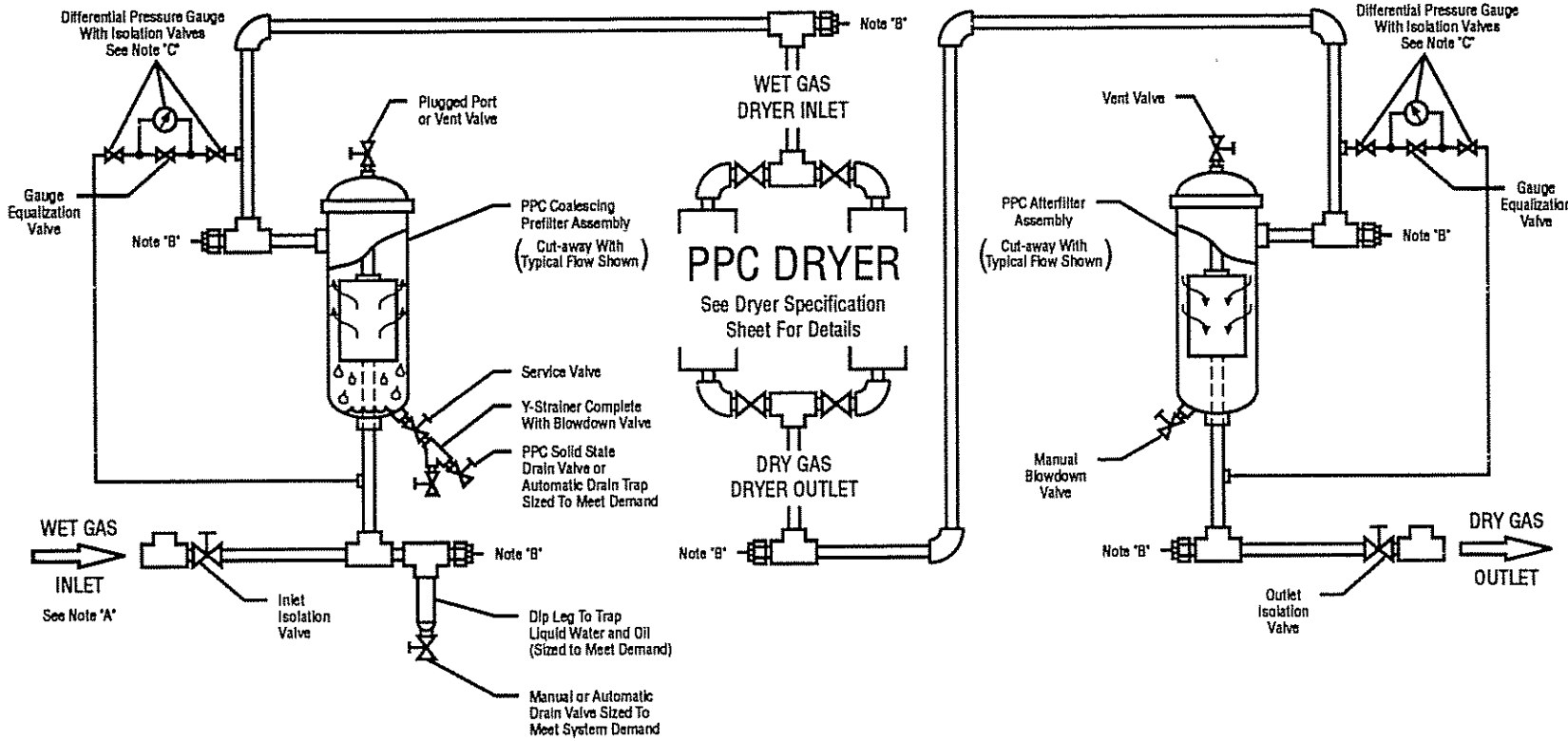
Example: What size should be used in an exhaust line which combines 25.0 feet of pipe; (3) 90° Ells? The dryer purge connection size is 3 inch pipe.

(3) ells @ 30 each = L/D = 90
Equivalent Length = 90 X D
L = 90 X (3 in./12 in.) = 22.5 ft.
22.5 ft. + 25 ft. of pipe run = 47.5 ft. total.
Use 4 in. Exhaust pipe and fittings.

2.6 Prefilter Installation

1. Allowing adequate clearance for filter cartridge installation and removal, locate and anchor the prefilter assembly as close to the dryer's WET GAS Inlet Connection as is possible.

   IMPORTANT: When the Prefilter Assembly is installed, the flow path must be from the inside (center), to the outside of the filter cartridges. (Unless otherwise specified by Pneumatic Products Corporation.)



IMPORTANT: Prefilter and Afterfilter Assemblies are an important and necessary part of your gas system. Please contact your local Pneumatic Products Corporation Sales Representative for information concerning these highly necessary filter assemblies if they are not included in your present system's design.

Note "A": All air or gas pipe lines prior to the Prefilter and Dryer System should be self draining. Avoid low spots where liquids can collect. When areas where liquids can collect are unavoidable, dip legs with adequate manual or automatic drain valves sized to meet the demand should be provided.

Note "B": Plugged Port — 3/4 inch NPT minimum size (useful while servicing equipment)

Note "C": If not used, valved pressure taps should be provided for service reasons.

Recommended Valve Installation and Piping Layout

FIGURE 2.1

2. Referring to FIGURE 2 1 as a guide; install the recommended piping configurations to the Prefilter Assembly's inlet and outlet connection ports. Ensure that all piping and valve sizes used are equivalent to, or larger than the dryer's WET GAS Inlet Connection. (Refer to Dryer Dimension and Connection Drawing for the WET GAS Inlet Connection size which is applicable to your specific dryer model.)

3. Remove the prefilter assembly's drain port plug and install an automatic drain valve or drain trap. Drain piping should discharge to a funnel-type drain connection or other easily visible point-of-discharge to aide in future operational inspections.

   Note: To ensure connection of the automatic drain valve or drain trap to the correct drain port, refer to the Prefilter Assembly Dimension and Connection Drawing which accompanies this manual when filters are purchased. The drain port will be located on the side or bottom of the filter assembly, depending on model ordered. Should question arise, obtain the filter assembly's model and serial numbers and contact your local Pneumatic Products Sales Representative for assistance.

4. If the drain valve utilized requires an electrical supply for operation, make connections as specified by Pneumatic Products Corporation, ensuring compliance with all applicable codes (NEMA, NEC, municipal, local, etc.).

2.7 Afterfilter Installation

1. Allowing adequate clearance for filter cartridge installation and removal, locate and anchor the afterfilter assembly at a site of convenience which is capable of receiving the filter assembly's inlet and outlet piping connections and isolation valves .

   IMPORTANT: When the Afterfilter Assembly is installed, the flow path **MUST** be from the outside to the inside (center) of the filter cartridges. (Unless otherwise specified by Pneumatic Products Corporation.)

2. Referring to FIGURE 2.1 as a guide, install the recommended piping configuration to the afterfilter assembly's inlet and outlet connection ports. Ensure that all piping and valve sizes used are equivalent to, or larger than the dryer's DRY GAS Outlet Connection. (Refer to the Dryer Dimension and Connection drawing for the DRY GAS Outlet Connection size which is applicable to your specific dryer model.)

2.8 Purge Exhaust Restrictor

1. The dryer's proprietary Purge Exhaust Restrictor quiets the gas flow and prevents desiccant bed fluidization by controlling (slowing) the rate of depressurization. To operate properly, the Purge Exhaust Restrictor must remain attached to the purge exhaust manifold.

2.9 Purge Exhaust Muffler

1. The dryer's proprietary Purge Exhaust Muffler quiets the gas flow to atmosphere during depressurization and regeneration (purge) cycles. This muffler must be piped **By The Customer** to a remote location. A removable section of pipe should be provided at the Purge Exhaust Restrictor for ease of maintenance and the muffler should be mounted in a self-draining position.

   Note: The pipe run from the dryer to the muffler should not exceed 100 equivalent feet of pipe using a pipe size equal to or larger than the Purge Exhaust Restrictor connection. Consult your local Pneumatic Products Sales Representative for requirements when the equivalent feet of pipe exceeds 100 feet.

2.10 Electrical Connection

Note 1: Use proper, load-rated components as approved by NEC, NEMA, CSA, UL, etc., as required. Local and municipal codes may also apply. All installations and connections must be in accordance with recognized electrical codes, in effect.

Note 2: It is mandatory that each dryer be individually GROUNDED. Do not use your plant's frame as a ground. Use an adequate ground with the conductor sized to NEC. The electrical supply must be a three wire, grounded service.

Note 3: A fused disconnect switch is **not** provided as standard equipment and therefore, must be supplied by the customer. The dryer's electrical load is indicated on the Dryer Specification & Performance Data Sheet.

Note 4: Pneumatic Products Corporation is not liable for code violations, component damage, downtime or consequential damages related to customer supplied and installed electrical components and connections.

Note 5: For units with microprocessor or electronic controllers, exercise CAUTION for Static Sensitive Devices before making electrical connections.

1. Refer to the dryer-mounted Specification Plate, (or the Dryer Specification & Performance Data Sheet) for your specific dryer model's electrical input requirements. Ensure that the intended power source conforms to these requirements.

   CAUTION: Surges, spikes and input voltage of less than ninety (90) VAC or greater than one hundred and thirty-two (132) VAC, may cause the Dryer Control System to operate erratically, or malfunction. This malfunction may or may not be accompanied by an alarm. Adequate surge, spike, brownout and blackout protection must be provided to protect your equipment and allow safe shutdown time. (An uninterrupted power supply is recommended.) Failure to do so may result in Wet Pilot Gas entering the control enclosure and damage to the equipment. Failure to provide adequate protection to the input voltage will void warranties.

   CAUTION: The electrical supply must be a three wire service. **Connect GND first to protect the microcomputer and IC chips from static damage. Connect L1 and L2 last.**

2. Using the conduit connection ports provided, connect the electrical input and ground leads to the Power Input and Remote Alarm Terminal Block. Make connections in accordance with the lead connection inscriptions (**GND, L1, L2**). **CONNECT GROUND LEAD (GND) FIRST.**

   CAUTION: Do not make any additional wiring connections to terminals L1, L2 or GND on the Power Input.

2.11 Remote Alarm Connection

WARNING!
Most standard air and gas dryers are furnished with contacts for remote alarms. These contacts should be wired to an audible alarm and/or to an area where they are continuously monitored. When these contacts are not used, the dryer must be visually checked every two (2) hours for existence of any possible malfunction. Immediate action must be taken to correct any indicated malfunction. Failure to do so may result in an upset condition that could damage the equipment. Failure to protect the dryer from aerosols and liquid condensate will void warranties.

1. Remote alarm terminals (A1, A2, A3) are provided for connection of a customer-supplied remote alarm circuit (if desired). Exercise CAUTION for Static Sensitive Devices before making alarm connections. Should an alarm situation or loss of the dryer's power supply occur, the remote alarm relay will de-energize to transfer contact from A3 to A2 for remote alarm actuation.

   Note: A customer supplied separate power source of sufficient voltage, (not to exceed 120 VAC) must be connected to terminal A1 for remote alarm actuation.

   CAUTION: The total current rating of all customer supplied remote alarm equipment **MUST NOT** exceed 6 amperes inductive, and 10 amperes resistive. Do Not make any additional wiring connections to terminals A1, A2, and A3.

3 Operation

3.1 General Information CHA Dryer

This fully automatic, heaterless-type dryer alternately cycles the compressed, processed gas flow through two desiccant-filled, vertical chambers where the gas's entrained, vaporous moisture content is adsorbed. One desiccant chamber is always on-stream in a timed DRYING CYCLE throughout normal dryer operation. The opposite, off-stream chamber is in a pressurized "stand-by" condition, or a timed RE-GENERATION CYCLE for removal of the desiccant's previously adsorbed moisture content. The dryer's "fail-safe" design feature provides continued process gas through both desiccant chambers if the control system's power supply is ever lost or interrupted.

The off-stream chamber will not depressurize and re-generate unless its previously adsorbed "moisture front" has reached the system's moisture sensing Amloc Probe. This elimination of unnecessary regen-eration extends dryer desiccant and component life. In addition, compressor component life is extended due to reduced cycling.

The microcomputer-based dryer control system is "self-checking". If an Amloc Probe related fault or malfunction ever occurs, the control system will auto-matically shift from the normal AMLOC CYCLE MODE of operation, to the secondary FIXED CYCLE MODE. During operation in the FIXED CYCLE MODE, a regeneration cycle will be conducted upon completion of each on-stream drying cycle. The panel mounted CYCLE MODE indication will shift from AMLOC CYCLE to FIXED CYCLE and a left or right CHAMBER PERFORMANCE DEGRADING alarm indicator will illuminate. A circuit board mounted REMOTE ALARM RELAY will de-energize for activation of any customer supplied remote alarm circuits.

Panel mounted LED indicators provided with the Amloc Cycle Unit areas follows:

1. Power On
2. Left Chamber Drying
3. Right Chamber Drying
4. Amloc Cycle Mode
5. Fixed Cycle Mode
6. Inlet Valve Malfunction
7. Exhaust Valve Malfunction
8. Left Chamber Performance Degrading
9. Right Chamber Performance Degrading

Also provided as standard dryer equipment are panel mounted gauges as follows:

1. Dryer Inlet Pressure
2. Dryer Outlet Pressure
3. Left Chamber Pressure
4. Right Chamber Pressure
5. Aquadex Moisture Indicator

A locally mounted Purge Pressure Gauge is installed adjacent to the purge adjusting valve for accurate setting of the regeneration purge pressure.

Fixed Nema Cycle Dryers are available without ben-efit of the Amloc control and have optional valve mal-function alarms.

Panel Mounted LED Indicators provided with the Fixed Cycle Unit are as follows:

1. Power On
2. Left Chamber Drying
3. Right Chamber Drying
4. Inlet Valve Malfunction (optional)
5. Exhaust Valve Malfunction (optional)

Panel or local mounted gauges are provided as follows:

1. Dryer Inlet Pressure (optional)
2. Dryer Outlet Pressure (optional)
3. Left Chamber Pressure
4. Right Chamber Pressure
5. Aquadex Moisture Indicator (optional)

A locally mounted Purge Pressure Gauge is installed adjacent to the purge adjusting valve for accurate setting of the regeneration purge pressure.

3.2 Description of Operation

The Amloc - CHA Dryer is specifically designed to remove vaporous moisture from compressed air or specific compressed gas systems. The dryer's fully automatic microcomputer control system alternately cycles the compressed gas flow through the unit's twin, desiccant filled chambers to accomplish this moisture adsorption process.

As the vapor-laden gas supply enters and flows downward through a desiccant chamber, the entrained moisture is attracted to and adsorbed on the surface of the activated desiccant. This adsorption is an exothermic (heat releasing) process which later contributes to regeneration. The dry gas then exits the dryer and proceeds downstream to intended points-of-use.

While one desiccant chamber is in the DRYING CYCLE previously described, the opposite, off-stream chamber will be in one of two possible conditions. During normal operation (AMLOC CYCLE MODE), the condition selected is totally dependent upon the previously adsorbed moisture content held by the off-stream desiccant chamber, as sensed by the chamber-installed Amloc Probe.

CONDITION 1:

The off-stream chamber will depressurize and proceed through a fixed time REGENERATION CYCLE to purge (remove) previously adsorbed moisture from its desiccant bed. During normal operation (AMLOC CYCLE MODE), a REGENERATION CYCLE will take place only when the desiccant bed's progressively advancing moisture front has reached the Amloc Probe. Upon completion of a REGENERATION CYCLE, the desiccant chamber will repressurize and once again be placed on-stream for another fixed time DRYING CYCLE.

CONDITION 2:

If the off-stream chamber's progressively advancing moisture front has not reached the Amloc Probe, a REGENERATION CYCLE is not required. In this situation the chamber will remain pressurized in a "stand-by" status while awaiting completion of the on-stream chamber's DRYING CYCLE.

The dryer cycles (DRYING, REGENERATION, STAND-BY and REPRESSURIZATION) are timed and initiated through programming of the microcomputer dryer control system. The dryer control system's INTERFACE VALVE ASSEMBLY utilizes its pilot gas supply to position the dryer's switching, purge exhaust and repressurization valves as required for the cycle at hand. The timed sequencing of your specific dryer model has been factory programmed to operate on either am AMLOC or FIXED DRYER (NEMA) CYCLE. This DRYER (NEMA) CYCLE is determined by the design dew point output of the dryer (-40°F or -100°F). Refer to the Dryer Specification and Performance Data Sheet for identification of your specific dryer model's design dew point output.

The dryer control system directs all phases of dryer control through one of two possible modes of operation. They are AMLOC CYCLE MODE and FIXED CYCLE MODE.

The AMLOC CYCLE MODE depressurizes and purges the dryer on a demand basis. Regeneration takes place only when necessary.

The AMLOC CYCLE MODE of operation will automatically shift to a FIXED CYCLE MODE to provide a backup means of continued dryer operation should a CHAMBER PERFORMANCE DEGRADING ALARM ever occur. The control system's "self-check" feature will automatically shift the control mode back to the AMLOC CYCLE MODE when the fault has been corrected.

The FIXED CYCLE MODE operates the dryer on a set predetermined Nema Cycle at all time without benefit of AMLOC control. A Switching Failure Alarm is optional on the Fixed Cycle Unit.

3.2.1 Description of the AMLOC CYCLE MODE

During dryer start-up, both desiccant chambers are simultaneously pressurized BEFORE the dryer's power supply is energized.

During system pressurization, the Inlet Switching Valve (V1) will remain in its last position. The Repressurization Valve (V7) is open and will close as the drying chamber pressurizes first and the standby chamber pressurizes through the purge system. The Purge Exhaust Valves (V3) and (V4) are closed by pilot gas pressure supplied through the de-energized Dryer Control System. The gas flow exits the dryer through the Outlet Switching Valve (V2) to a closed outlet isolation valve (customer supplied). This valve will be manually opened SLOWLY following dryer pressurization.

When the dryer's power supply is energized, the Inlet and Outlet Switching Valves V1 and V2 will switch to Left Chamber Drying if the valves are not already in that position. The dryer is now in a control system timed Left Chamber Drying Cycle.

Note 1: When the power supply is energized, the control system's "self-check sequence" will momentarily test both Amloc Probes and their associated circuitry. If a fault is detected, the control system will immediately shift to the FIXED CYCLE MODE of operation and illuminate the appropriate left or right CHAMBER PERFORMANCE DEGRADING alarm. The self-check sequence will repeat upon commencement of each Left Chamber Drying Cycle.

The Dryer Control System now evaluates a frequency signal received from the right chamber's Amloc Moisture Probe. This "moisture content-related" input is compared to a fixed setpoint to determine if a REGENERATION (purge) CYCLE is necessary for removal of previously adsorbed moisture from the right chamber's desiccant bed. If the Amloc Probe's input signal is equal to, or slightly lower than the control system's setpoint, a REGENERATION CYCLE is required prior to placing the right chamber on-stream for a timed DRYING CYCLE. The Dryer Control System now signals its INTERFACE VALVE ASSEMBLY to vent pilot pressure from the closed right chamber PURGE EXHAUST VALVE V4. The PURGE EXHAUST VALVE V4 is then opened by direct pressure exerted from the right chamber, followed by depressurization to atmosphere through the FLOW RESTRICTOR V8. REPRESSURIZATION VALVE V7 is then closed by direct pressure exerted from the left chamber.

Note 2: If the Amloc Probe frequency signal is above the microcomputer's setpoint, a REGENERATION CYCLE is not required. The moisture content held by the chamber's desiccant bed is below the design criteria. The right chamber will remain pressurized in a "STAND-BY" status until the left chamber completes its timed on-stream DRYING CYCLE.

Immediately following depressurization, a regulated flow of dry purge gas enters the right chamber through PURGE CHECK VALVE V6. This dry purge gas flow passing upward through the chamber at atmospheric pressure, in conjunction with the desiccant bed's previously acquired "heat of adsorption," creates an environment which causes the desiccant to release its previously adsorbed moisture. The purge gas flow and the acquired vaporous moisture exit the chamber through the open PURGE EXHAUST VALVE V4 and is discharged to atmosphere through the FLOW RESTRICTOR V8 and PURGE EXHAUST MUFFLER. Operation continues until the timed REGENERATION CYCLE is completed. Immediately upon completion of regeneration, the control system supplies pilot pressure to PURGE EXHAUST VALVE V4 for closing, and to REPRESSURIZATION VALVE V7 for opening. System pressure supplied from the left chamber then repressurizes the regenerated right chamber.

The control system will isolate the pilot gas previously supplied to REPRESSURIZATION VALVE V7, upon completion of the right chamber's REPRESSURIZATION CYCLE. REPRESSURIZATION VALVE V7 will then close. When repressurization is complete the control system signals the interface valve assembly to vent pilot pressure from Pilot Port (B) of the INLET and OUTLET SWITCHING VALVES V1 and V2. The regenerated and repressurized right chamber has now been fully prepared for switchover to an on-stream DRYING CYCLE.

When switchover to a timed RIGHT CHAMBER DRYING CYCLE is initiated, the control system signals its interface valve assemblies to apply pilot pressure to Pilot Port (B) of the INLET and OUTLET SWITCHING VALVES V1 and V2. The INLET and OUTLET SWITCHING VALVES V1 and V2 are open to Right Chamber Drying.

The previous sequential description of dryer operation and alignment in the AMLOC CYCLE MODE (commencing at paragraph which follows "Note 1"), is now conducted on OPPOSITE chambers as follows: RIGHT CHAMBER: DRYING CYCLE.

LEFT CHAMBER: Remains pressurized in STAND-BY status, or depressurizes for a REGENERATION CYCLE, depending upon desiccant bed's previously adsorbed moisture content.

3.2.2 Description of the FIXED CYCLE MODE

Your dryer will operate in the FIXED CYCLE MODE for one of the following reasons:

A) Purchased for Fixed Cycle operation only.

B) AMLOC CYCLE MODE Dryer operating with probe-related malfunction.

The following Amloc Probe-related faults and conditions will cause the dryer control system to shift from the AMLOC CYCLE MODE to the FIXED CYCLE MODE of dryer operation.

Note: Operation of an AMLOC CYCLE MODE Dryer in the FIXED CYCLE MODE will ALWAYS be accompanied by a CHAMBER PERFORMANCE DEGRADING ALARM.

1. Damaged or faulty Amloc Probe.

2. Bad connection between an Amloc Probe and its associated Remote Sensor Assembly.

3. Faulty Remote Sensor Assembly.

4. Faulty or bad connection between a Remote Sensor Assembly and the Remote Sensor Assembly Terminal Block.

5. Disconnecting one or both of the Probe Connector Cables from the associated Remote Sensor Assembly.

6. Operation of the dryer beyond its maximum design flow rate, resulting in excessive moisture loading of the desiccant beds. This overload condition would lower the Amloc Probe's moisture-related frequency signal below the microcomputer's comparator setpoint range. This below range frequency signal will activate the appropriate CHAMBER PERFORMANCE DEGRADING ALARM (left or right).

7. Allowing gas to flow through the dryer for an extended time period with the dryer control system de-energized. When the control system is de-energized, **one** desiccant chamber is placed on-stream, and regeneration is not conducted. Without regeneration, the desiccant beds will eventually become overloaded with adsorbed moisture. When the power supply is re-energized, the moisture-overload condition will lower the Amloc Probe's moisture-related frequency below the microcomputer's comparator setpoint range. This below range frequency signal will activate the appropriate CHAMBER PERFORMANCE DEGRADING ALARM (left or right).

Dryer operation, including switchover, remains fully automatic in the FIXED CYCLE MODE with one of the two desiccant chambers on-stream at all times in a fixed-time DRYING CYCLE. However, unlike the AMLOC CYCLE MODE of dryer operation, the FIXED CYCLE MODE does not utilize the Amloc Probes to determine if an off-stream chamber requires a REGENERATION CYCLE when Probe related faults 1 through 5 exist. The dryer control system will automatically conduct a fixed-time REGENERATION CYCLE following each DRYING CYCLE, regardless of a chamber's adsorbed moisture content.

The dryer control system will automatically proceed through a probe "self-check" sequence at the beginning of each left chamber DRYING CYCLE. When the Amloc Probe related malfunction has been corrected, the dryer control system will automatically return to the AMLOC CYCLE MODE, following a satisfactory self-check sequence.

3.3 Valve Malfunction Alarm

The dryer control system is equipped with annunciator panel mounted alarm indicators which will illuminate to provide indication of an inlet switching or purge exhaust switching valve malfunction.

This alarm circuit utilizes the VALVE MALFUNCTION ALARM Pressure Sensor, which receives a pressure input from each desiccant chamber. The dryer control system checks and evaluates these pressure signals throughout each REGENERATION CYCLE and upon completion of each REPRESSURIZATION CYCLE. An inlet switching or purge exhaust switching valve malfunction will create a desiccant chamber pressure condition which is inappropriate for the REGENERATION or REPRESSURIZATION CYCLE at hand. The dryer's LOGIC CONTROL CIRCUIT BOARD receives and evaluates the alarm signal received from the pressure sensor and then illuminates the appropriate INLET and/or EXHAUST VALVE MALFUNCTION alarm indicator. The REMOTE ALARM RELAY will also de-energize upon an alarm condition to activate any customer supplied remote alarm circuits.

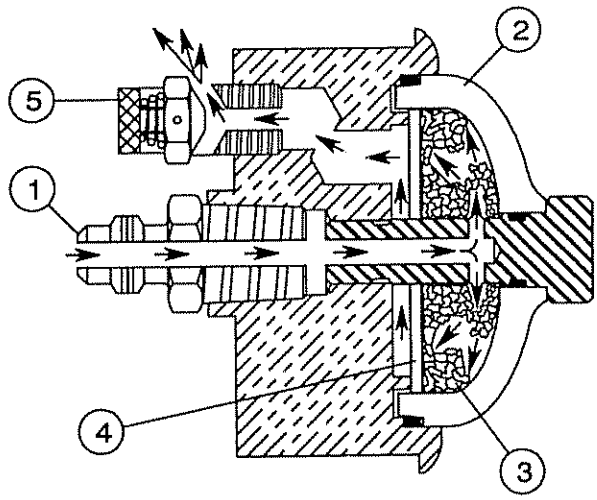
The dryer's operational cycling will be automatically placed in a "hold" condition until the cause of alarm activation has been remedied. Resumption of normal dryer operation and immediate deactivation of the valve malfunction and remote alarm circuits will then take place.

CAUTION: Do not attempt to adjust the Pressure Sensor setpoint adjustment screw. Improper adjustments will result in alarm activation and subsequent dryer malfunction.

3.4 Aquadex Moisture Indicator

The panel mounted Aquadex Moisture Indicator provides a constant visual indication that dry gas is being supplied to the dryer's outlet connection. A sampling line installed at the dryer's outlet supplies a small, continuous gas sample to the moisture indicator for circulation.

As illustrated, the gas sample supplied from the dryer outlet enters the moisture indicator's inlet connection [1], and circulates through a desiccant filled sight dome [2]. The granular indicator [3], is a specially treated "silica gel" which gradually changes from blue to pink in color whenever a "wet" gas sample is received. This change alerts personnel of a moisture problem which requires corrective action. The color will return to blue when dry gas is once again supplied to the dryer outlet. The gas exits the sight dome through a porous disc [4] and vents to atmosphere through an adjustable bleed valve [5[. This bleed valve must be left open slightly at all times to provide a continuous sampling of the dryer outlet gas.



3.5 Start-Up

WARNING!
Ensure that the dryer is de-energized, valve isolated, and fully depressurized before attempting to remove or disassemble any dryer component or subassembly. Failure to do so may result in serious personal injury and/or equipment damage.

CAUTION: Each component of a Pneumatic Products Corporation Air Purification System has been selected to compliment the performance of the other components of the system. Therefore, use of unauthorized parts or supplies or improper operation will degrade system performance.

1. Remove the Pilot Gas Filter Bowl. Verify that the pilot gas filter cartridge is installed. Replace Filter Bowl ensuring that O-ring is properly seated. Close the filter bowl bleed valve.

   Note: All Prefilter and Afterfilter Assemblies are shipped **WITHOUT** filter cartridges installed. Prefilter and Afterfilter cartridges are **NOT** interchangeable and must be installed in their respective assemblies **ONLY**. The proper filter cartridge part number is listed on each Prefilter and Afterfilter Assembly.

2. Refer to the Prefilter and/or Afterfilter Assembly drawings which separately accompany this manual when filter housings are included with the dryer purchase. Install the required quantity and filter cartridge type. Ensure that:

   a) Filter assemblies have been properly piped into the system. This should be checked by visually noting the "as-piped" flow path through each assembly's filter cartridges as follows: Flow through prefilter cartridges **MUST** be from the **inside** (center) to the **outside**. Flow through afterfilter cartridges **MUST** be from the **outside** to the **inside**.

   b) All filter cartridges with wide end grooves require end seals at each end, while filter cartridges with one end closed do not require end seals.

   c) Cartridge-retaining Seal Nuts (when applicable) are screwed on "hand-tight" then tightened an additional one-half (1/2) turn. **Do not overtighten. Excessive tightening will damage tie rods.**

3. Replace and tighten filter assembly covers or bowls, (as applicable). Ensure that gaskets or O-rings, (as applicable), are properly seated.

4. Close any manual vent or drain valves installed in prefilter and afterfilter assemblies.

5. If the prefilter assembly utilized was factory-equipped with an automatic drain valve or drain trap, inspect for, and remove pipe plug or cap which may have been installed in drain port for shipping purposes.

6. Ensure that all associated pipe and tubing connections, flanges, unions, plugs, mounting bolts, pipe hangers, etc., have been checked tight and/or properly secured.

7. Open the dryer control system enclosure and locate the Pilot Gas Regulator. Ensure that the set point marking on the regulator's pressure adjustment knob is in alignment with the set point marking on the regulator's body. **No further adjustment should be necessary.**

   IMPORTANT: It is recommended that the dryer's process gas output not be consumed or used at the intended point-of-use until the start-up and any related adjustments have been completed, and the system is producing process gas of the required quality. The quality of the process gas should be verified through test and analysis when a specific quality process gas is required.

8. Refer to the Dryer Dimension and Connection drawing as necessary for component identification and location while conducting start-up and operational procedures.

   Note: If your dryer cannot be started, or fails to start due to special installation or other problems, contact your local Pneumatic Products Sales Representative for assistance.

9. Close the Dryer Outlet Isolation Valve (customer supplied).

10. Close the Pilot Gas Supply Valve and pressurize the pilot gas system with compressed gas to line pressure. Use the Tank Valve located in the pilot gas line prior to the Pilot Gas Filter and after the Pilot Gas Supply Valve.

11. Supply pressure to the dryer by slowly opening the Dryer Inlet Isolation Valve (customer supplied). The Inlet Switching Valve will be open to either left or right chamber. Both Purge Exhaust Valves will close and pressure will begin to rise to system pressure as indicated by the panel mounted pressure gauges. The remaining chamber will pressurize through the purge orifice until it reaches system pressure.

12. When both chambers are at supply pressure, open the Pilot Gas Supply Valve and disconnect the gas supply to the pilot gas system at the Tank Valve.

13. The Aquadex Moisture Indicator's Bleed Valve is installed directly into the back of the indicator's body. Close the Indicator's Bleed Valve. **FULLY** open the Moisture Indicator Supply Valve.

14. Soap bubble test all external piping, fittings and connections. Locate and repair all noted points of leakage. **DO NOT** soap bubble test components located inside dryer control system's enclosure.

    Note: Small leaks noted in inlet piping to the dryer will not affect operation, other than a slight loss of pressure supplied to the dryer. However, any gas leaks, (no matter how small), detected at, or downstream of the dryer outlet **MUST BE FIXED** to ensure that the dryer will provide a continuous supply of process gas at specified dew point, to intended points-of-use.

    IMPORTANT: Water molecules can diffuse through a pinhole-size leak even though pressure inside the piping is several hundred PSIG. It is not uncommon to have a minute pinhole leak in a gas line cause an increase in dew point from -40°F to -10°F at a distance of forty or more feet downstream of the leak.

15. While monitoring the panel mounted Outlet Pressure Gauge, **SLOWLY** open the Dryer Outlet Isolation Valve (customer supplied). **DO NOT** permit the Dryer's Outlet Gauge to exceed a five percent (5%) drop in pressure while pressurizing downstream piping.

16. Close the Dryer Bypass Valve (if gas system has been so-equipped).

17. Open and adjust the Aquadex Moisture Indicator's Bleed Valve until a **very slight**, continuous gas bleed is felt exhausting from the bleed valve's exhaust port. Ensure that the granular indicator crystals remain motionless after final adjustment.

18. Energize the dryer's electrical power supply. The Amloc Cycle Dryer annunciator panel indicators will illuminate and indicate:

    a) POWER ON
    b) LEFT CHAMBER DRYING
    c) AMLOC CYCLE MODE or FIXED CYCLE MODE, accompanied by a CHAMBER PERFORMANCE DEGRADING alarm.

    Note: The dryer will operate in the FIXED CYCLE MODE accompanied by a CHAMBER PERFORMANCE DEGRADING alarm, until the desiccant beds have been regenerated to the extent necessary to provide a process gas supply at the dryer's rated dew point. The control system will then automatically shift to the AMLOC CYCLE MODE. If the dryer fails to shift to the AMLOC CYCLE MODE within twenty-four (24) hours, refer to the **Troubleshooting Guide** and perform checks listed for a CHAMBER PERFORMANCE DEGRADING alarm.

    The FIXED CYCLE DRYER annunciator panel indicators will illuminate and indicate:

    a) POWER ON
    b) LEFT CHAMBER DRYING

19. Purge Setting and Adjustment

    a) Locate the Critical Orifice Calibration Curve.

    b) Locate the purge flow requirements on the Dryer Specification and Performance Data Sheet.

    c) Cross this Purge Flow requirement to the same number on the Critical Orifice Calibration Curve Sheet.

    d) Follow this line vertically and then horizontally once intersection is made with the curve line to find the actual purge pressure setting.

20. SLOWLY rotate dryer's Purge Adjusting Valve until the Purge Pressure Indicator indicates the calculated purge pressure setting.

    Note: The purge pressure can only be read and adjusted when an off-stream desiccant chamber has depressurized for regeneration. (When the off-stream chamber is pressurized, the Purge Pressure Indicator will read "system pressure".) During operation in the AMLOC CYCLE MODE, the off-stream chamber may remain pressurized (in STAND-BY — no regeneration necessary). If this condition is noted, proceed as follows to adjust purge pressure.

    a) Remove Probe Connector Cable from the left chamber's Remote Sensor Assembly.

    b) De-energize dryer's electrical power supply for approximately fifteen (15) seconds; then reenergize. The right chamber will depressurize to atmosphere for regeneration.

    c) Calculate and set purge pressure as previously instructed.

    d) Reconnect Probe Connector Cable to the left chamber's Remote Sensor Assembly. De-energize the dryer's electrical power supply for approximately fifteen (15) seconds; then reenergize.

21. The Start-Up procedure is now complete. Proceed to the **Normal Operational Checks** section of this manual for final operational checks and adjustments.

3.6 Normal Operational Checks

1. Ensure that the dryer is being operated at the correct inlet pressure, flow rate and inlet temperature, as specified on the Dryer Specification and Performance Data Sheet.

2. If the dryer is equipped with a prefilter which utilizes any automatic drain device, ensure that it is draining and functioning properly.

3. Ensure that the Purge Pressure Indicator (gauge) indicates the pressure setting calculated during start-up.

    Note: The purge pressure can only be read and adjusted when the off-stream chamber has depressurized for regeneration. When the off-stream chamber is pressurized, the Purge Pressure Indicator will read "system pressure".

4. If the dryer is operating in the FIXED CYCLE MODE, it should automatically shift to the AMLOC CYCLE MODE within twenty-four (24) hours of start-up. If dryer fails to shift to the AMLOC CYCLE MODE within this time period, refer to the **Troubleshooting Guide** and conduct checks listed for CHAMBER PERFORMANCE DEGRADING alarm.

Note: The dryer will operate in the FIXED CYCLE MODE accompanied by a CHAMBER PERFORMANCE DEGRADING alarm until the desiccant beds have been regenerated to the extent necessary to provide a process gas supply at the dryer's rated dew point. The control system will then automatically shift to the AM-LOC CYCLE MODE.

5. After an off-stream desiccant chamber has depressurized for regeneration, a flow of purge gas should be felt exiting the purge exhaust muffler. The regenerating chamber's panel mounted pressure gauge **MUST** indicate zero (0) PSIG throughout the purging period.

   Note: During normal dryer operation (AMLOC CYCLE MODE), the off-stream desiccant chamber will depressurize and begin regeneration (purging) **ONLY** when the need for a regeneration cycle is sensed by the chamber's Amloc Probe. Otherwise, the off-stream chamber will remain pressurized.

6. If the Aquadex Moisture Indicator's granular indicator is **pink** at the time of dryer start-up, a color change to **blue** should be noted within twenty-four (24) hours. Ensure that the indicator's bleed valve has been adjusted as instructed in the start-up procedure.

7. Ensure that the Dryer Inlet and Outlet Isolation valves (customer supplied) have been **fully opened**, and the Dryer Bypass Valve (customer supplied) has been **fully closed**.

8. Ensure that the dryer control system's enclosure cover is closed with all latches tightened to prevent entrance of moisture, dust, dirt, etc.

9. **Shutdown and Depressurize Dryer** following two (2) to three (3) weeks of initial operation. Inspect desiccant beds through fill ports, for settling. If settling has occurred, refill chambers as necessary to bring desiccant levels to the bottom of each desiccant retaining screen. **DO NOT TAMP OR RAM DESICCANT**.

3.7 Dryer Shutdown

1. De-energize the dryer's electrical supply. When the dryer's power supply is de-energized, the desiccant chamber last on-stream will remain on-stream. When the power supply is restored, the dryer will go back on-stream with left chamber drying automatically.

2. If the gas system **must** continue supplying **unprocessed** gas to points-of-use, open the Dryer Bypass Valve (if gas system has been so equipped).

3. Close the Dryer Inlet and Outlet Isolation Valves (customer supplied).

   IMPORTANT: Inlet and Outlet Isolation Valves MUST be closed to prevent moisture overloading of desiccant beds, due to continuous flow without regeneration.

4. Close the Moisture Indicator Supply Valve. This **MUST** be done to prevent depressurization of the pilot gas supply, which in turn , will eventually result in dryer depressurization.

5. Shutdown is now complete. The dryer may be left pressurized during periods of non-use, if desired. However, if any servicing or maintenance is to be performed, ensure that the dryer is fully depressurized BEFORE beginning work. Proceed to Step 6 for depressurization instructions.

   WARNING!
   Ensure that the dryer is de-energized, valve isolated and fully depressurized before attempting to remove or disassemble any component or subassembly. Failure to do so may result in serious personal injury and/or equipment damage.

6. To depressurize dryer, proceed as follows:

   a) Close the Pilot Gas Supply Valve.

   b) Open the Pilot Gas Filter's Bleed Valve.

   c) Open the Moisture Indicator Supply Valve.

      Allow pilot gas system to depressurize through Aquadex Moisture Indicator's Bleed Valve and the Pilot Gas Filter's Bleed Valve. When pilot gas pressure is sufficiently reduced, the purge exhaust switching valves will automatically open to depressurize dryer through purge exhaust muffler.

   d) Depressurization is complete when all dryer pressure gauges indicate zero (0) PSIG.

4 Maintenance and Repair

4.1 Preventative Maintenance Schedule

Weekly

1. Check the following operating conditions:
   a) Purge Pressure Setting (during regeneration)
   b) Inlet and Outlet Pressure (record)
   c) Inlet Flow Rate (record)
   d) Inlet Temperature (record)

   For optimum dryer operation and performance, these recorded parameters should correspond as close as is possible to the design operating conditions and specifications noted on the Dryer Specification & Performance Data Sheet.

2. Visually inspect the Aquadex Moisture Indicator for a Blue (dry) indication. If the indicator is pink (wet) in color, refer to the **Troubleshooting Guide** and conduct checks listed for the Aquadex Moisture Indicator.

3. Check the dryer's indicator panel for the presence of any illuminated alarm indicators. If dryer operation has shifted from the AMLOC CYCLE MODE to the FIXED CYCLE MODE of operation, or an alarm indicator is illuminated, refer to the **Troubleshooting Guide**.

4. Check the pressure drop (differential pressure) across the prefilters and afterfilters. (Unless ordered as an option, the prefilter and afterfilter differential pressure gauges are customer supplied.) Prefilter and afterfilter cartridges should be replaced BEFORE a differential pressure of 10 psid is exceeded.

   CAUTION: Each component of a Pneumatic Products Corporation Air Purification System has been selected to compliment the performance of the other components of the system. Therefore use of unauthorized parts or supplies or improper operation will degrade system performance.

5. Check operation of the prefilter's automatic drain valve or drain trap (if so-equipped). This component must function properly to maintain filter efficiency and prevent premature desiccant failure induced by liquid and oil carry-over from the prefilter, due to a clogged or inoperative drain valve or drain trap.

Quarterly

1. Check the dry gas outlet dew point. A precision Dew Point Analyzer is required to read the exact dew point. The analyzer should be connected as close to the dryer outlet as is possible. Test piping or tubing used to connect the analyzer to the gas system must be metallic. Rubber and certain plastics permit moisture diffusion from the ambient air and can cause a false high dew point indication. Alnor, Beckman, Shaw and several other brands of precision dew point instruments are available.

Semi-Annually

WARNING!
Ensure that the dryer and any associated Prefilters and Afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

CAUTION: Each component of a Pneumatic Products Corporation Air Purification System has been selected to compliment the performance of the other components of the system. Therefore, use of unauthorized parts or supplies or improper operation will degrade system performance.

1. Inspect the Pilot Gas Filter Cartridge and replace if the used cartridge appears clogged, dirty or excessively corroded.

2. Inspect the Prefilter Cartridges for clogging, excessive corrosion, cracked or damaged end seals or high pressure drop (differential pressure exceeds 10 psid.). Replace cartridges if necessary.

3. Inspect the Afterfilter Cartridges for clogging, excessive corrosion, cracked or damaged end seals or high pressure drop (differential pressure exceeds 10 psid.). Replace cartridges if necessary.

Annually

WARNING!
Ensure that the dryer and any associated Prefilters and Afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Disassemble, clean and inspect the Outlet Switching and Purge Check Valve Assemblies. Replace all damaged or worn parts.

2. Disassemble, clean and inspect the Inlet Switching and Purge Exhaust Switching Valve Assemblies. Replace all damaged or worn parts.

3. Disassemble, clean and inspect the Repressurization Valve Assembly. Replace all damaged or worn parts.

4. Remove the desiccant fill port plugs and desiccant retaining screens from the top of each desiccant chamber. Visually inspect the desiccant through each chamber's fill port. Replace desiccant if it appears badly broken or contaminated with oil.

   The frequency of desiccant replacement is dependent on the actual operating conditions present, and will vary in all cases. These conditions can be process related, mechanical or accidental. A rising dew point at the dryer outlet is an indication that new desiccant is required. This assuming that the dryer is functioning properly from a mechanical and control standpoint, and the dryer is not being overloaded (operated above its maximum flow capacity).

4.2 Desiccant Charging Procedures

Note: Periodic desiccant replacement is necessary to maintain dryer performance. The frequency of desiccant replacement is dependent on the actual operating conditions present, and will vary in all cases. These conditions can be process related, mechanical or accidental. A rising dew point at the dryer outlet is an indication that new desiccant is required.

WARNING!
Ensure that the dryer and any associated Prefilters and Afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

CAUTION: Your dryer has been designed to use a specific desiccant. Use of any other size or type may reduce efficiency and/or damage the dryer.

CAUTION: Prior to installing desiccant, review all applicable material safety data sheets and container warnings. Safety Data Sheets may be obtained from the manufacturers Safety Coordinator. Exercise all necessary precautions for your health and welfare.

WARNING!
A static electric charge can build up when pouring desiccant or dry powders. Proper grounding should be observed when pouring from container (bag, drum, etc.).

WARNING!
When transferring desiccant under pressure wear goggles. Malfunction or improper use of equipment can propel beads with enough velocity to penetrate skin. Ensure that the transfer system and receiving vessels are properly grounded and follow safe operating procedures.

WARNING!
Used desiccant material must be handled with special care. Desiccant is an adsorbent material. Used desiccant may contain chemicals and/or gases that are hazardous, toxic and/or flammable. It is recommended that all used desiccant be analyzed to determine content before disposal. Exercise proper care and procedures during handling and storage of used materials. All containers must be properly labeled and disposed of in accordance with local, state and federal regulations.

WARNING!
This note is applicable to Amloc Cycle Dryers only. Do not install desiccant with the Amloc Probe in place prior to completion of the fill process to the bottom of the Amloc Probe half coupling. Failure to remove the probe may damage it and cause the dryer to malfunction.

WARNING!
Never attempt to remove, loosen or tighten an Amloc Probe which is installed in a desiccant filled chamber. Desiccant must first be drained to prevent Amloc Probe damage.

1. Remove the fill port closure and integral desiccant retaining screen installed in the top of each desiccant chamber. Clean and inspect the desiccant fill port closure and desiccant retaining screen.

   Note: If this is an INITIAL DESICCANT INSTALLATION PROCEDURE go to Procedure 9.

2. Place a container suitable for receiving the spent desiccant under the desiccant chambers.

3. Remove the desiccant drain port plugs from the bottom of each desiccant chamber. When the drain port plug has been removed, the desiccant will begin draining.

4. When the desiccant has stopped draining, open the center drain port closure and remove the desiccant retaining screen from the bottom of each desiccant chamber.

5. Use a flashlight to inspect each chamber through its respective ports to ensure that all desiccant has been drained. LIGHT tapping on the chamber side with a soft-faced mallet will remove any desiccant that may have remained in each chamber.

6. Use a wire brush to clean drain ports and drain port plug threads. Remove any blockage which may have lodged in the desiccant's retaining screen slotting.

7. Apply thread sealant to the drain plug threads. Reinstall drain port plugs, bottom desiccant retaining screens and center drain closures. Torque to a reasonable limit.

8. Carefully remove the Amloc Probes from the desiccant chambers. Do not disassemble. Wipe clean with a soft clean cloth and inspect for any visible damage.

   CAUTION: Handle the Amloc Probe with care to prevent damaging the probe's TFE finish or ceramic insulators.

9. Refer to the Dryer Specification & Performance Data Sheet and/or the following table for the quantity of desiccant and tabular support required for each desiccant chamber.

   Note: When using the following DESICCANT TABLE you will find the desiccant quantities listed in **layers**. Each layer will vary in depth due to the type, quantity and purpose of the desiccant. **Layer number one** must be installed **first** at the bottom of the vessel **followed by layer number two** etc. until the complete charge of desiccant has been installed.

   Note: Before beginning any desiccant installation, verify the existence of the desiccant retaining screens located at the bottom of each desiccant chamber.

10. Utilizing an appropriate sized funnel, fill each desiccant chamber as follows:

    a) Install the specified quantity of tabular support in layer 1 of each chamber.

    b) Level layer 1 and each subsequent layer of desiccant as added to each chamber.

    c) Fill Amloc Dryer chamber with desiccant until the desiccant is level with the bottom of the two inch (2") Amloc Probe half coupling. If your dryer is a fixed cycle design and does not have Amloc Probes, go to procedure (f).

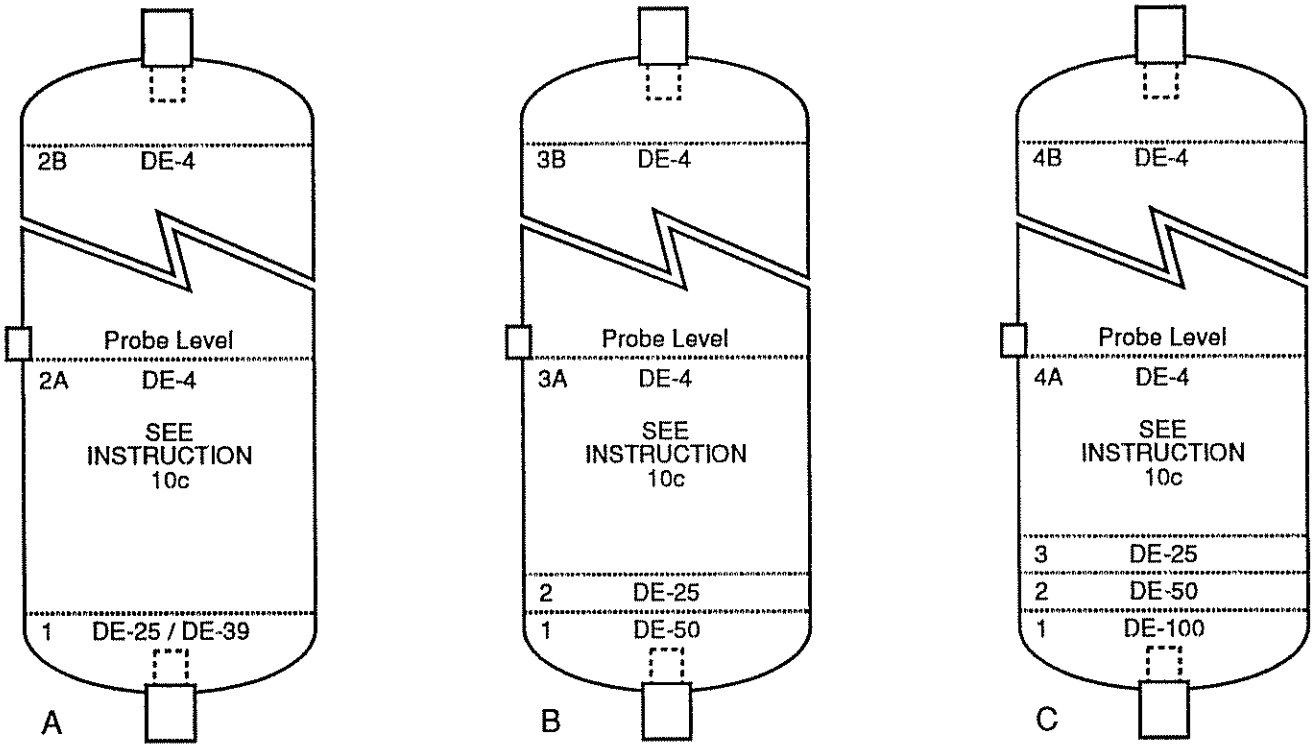
    d) Apply an appropriate thread sealant to each probe's male threads to ensure a leak tight seal.

    e) Install an Amloc Probe in each desiccant chamber's threaded half coupling. Apply sufficient torque to ensure a leak tight seal. **FURTHER TIGHTENING MUST NOT BE ATTEMPTED AFTER COMPLETION OF DESICCANT FILL PROCEDURE.**

    f) Finish filling each chamber with desiccant until the desiccant has been installed. LIGHT tapping on chamber sides with a **soft-face** mallet should yield additional free space to allow installation of the desiccant required. **DO NOT TAMP OR RAM DESICCANT.**

Note: Do not be alarmed if the specified quantities of desiccant cannot be installed in each chamber. Desiccant levels will settle after approximately two to three weeks of normal operation. Following this "settling" period, desiccant should be added as necessary to bring the levels up to the **BOTTOM** of each retaining screen (when installed).

11. Clean the fill port closure. Reinstall the desiccant retaining screen and fill port closure in each desiccant chamber. Torque to a reasonable limit.



DESICCANT CHARGE PER CHAMBER									
DRYER SIZE	FIGURE REF.	(layer #1) (lbs.)	(p/n)	(layer #2) (lbs.)	(p/n)	(layer #3) (lbs.)	(p/n)	(layer #4) (lbs.)	(p/n)
1600	A	75	DE-25	875	DE-4	—	—	—	—
2500	A	270	DE-39	1350	DE-4	—	—	—	—
3000	A	270	DE-39	1350	DE-4	—	—	—	—
3600	B	330	DE-50	109	DE-25	1950	DE-4	—	—
4900	B	630	DE-50	150	DE-25	2500	DE-4	—	—
6400	C	735	DE-100	360	DE-50	184	DE-25	3300	DE-4
8100 10000 12100	BED SUPPORT DESIGN VARIES CONSULT FACTORY FOR CORRECT WEIGHTS								

4.3 Aquadex Moisture Indicator Recharging Procedure

Note: Dryer shutdown is not necessary to perform the following procedure and can be accomplished without removing the entire assembly from the gauge panel.

1. Close the Moisture Indicator Supply Valve, and ensure that moisture indicator has fully depressurized through bleed valve (5) before proceeding to step #2 for disassembly. (See following **WARNING**.)

   WARNING!
   Ensure that the Moisture Indicator is fully depressurized before attempting disassembly. Failure to do so may result in serious personal injury and/or equipment damage.

2. Remove sight dome assembly (items 2, 3, 4, 6 and 9) from body (8) by turning screw (6) counter-clockwise.

3. Remove screw (6) from sight dome (2) by exerting pressure on screw's threaded end. Drain granular indicator.

4. Remove porous disc (4) and clean sight dome. (See following **CAUTION**.)

   CAUTION: The Sight Dome (2) is an acrylic plastic. Do not clean with any type of solvent.

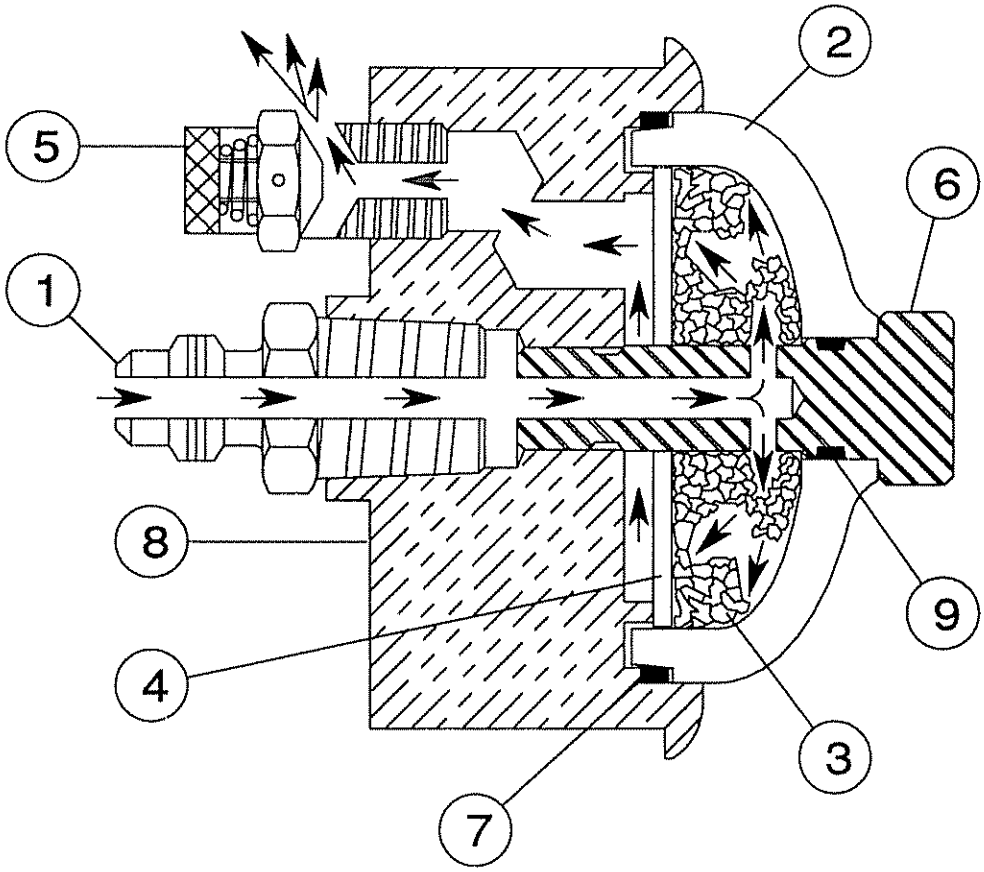
5. Replace O-ring (9), and reinstall screw (6) in sight dome (2).

6. Carefully pour new granular indicator (3) into sight dome. Slide porous disc (4) into place.

7. Replace O-ring (7) and reinstall sight dome assembly (items 2, 3, 4, 6, 7 and 9) in body (8).

8. Fully open the moisture indicator's gas supply valve (not shown).

9. Adjust bleed valve (5) until only a very slight constant gas bleed valve is felt exhausting from the valve's bleed port. **Ensure that granular indicator remains motionless after final adjustment.**



4.4 Switching Valve Disassembly/Assembly For Dryer Model 1600

WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Disconnect pilot air tubing and position indicator cables. Remove valve from the pipe manifolds.

2. Clean and inspect valve seats and poppets for damage and excessive wear. Use mirror. Do not disassemble valve at this time. Manually apply pressure to the poppet and push it back and forth several times. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Build the valve position indicator in the order shown in the valve assembly diagram.

2. Disassemble/Build the valve assembly in the order shown in the valve assembly diagram.

   A) Invert the valve body as shown in Detail B.
   B) Carefully insert the roll pin into the slot of the dome cover.
   C) Support the actuator subassembly, install the connectors.

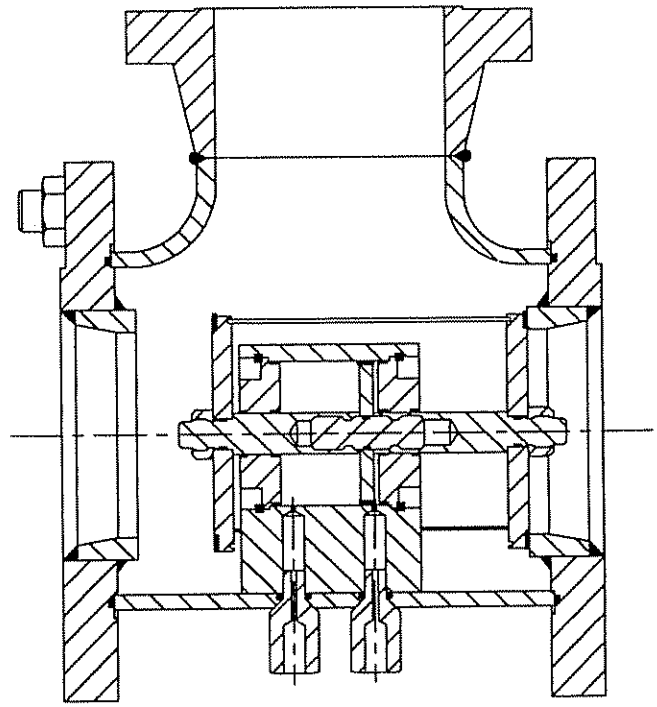
      Note: O-rings should be lightly lubricated to prevent shearing.

   D) Tighten connectors to torque specified in Chart A.
   E) Lockwire connectors as shown in Detail A.
   F) Hand tighten studs in sequence shown in Detail C.
   G) Tighten studs in sequence shown to torque specified in Chart A.
   H) Test Valve.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Actuator Subassembly	1	
3	Valve Seat	2	
4	Connector	2	
5	Lockwire	1	A, B
6	O-Ring (Valve Body)	2	A, B
7	O-Ring (Connector)	2	A, B
8	Threaded Stud	4	
9	Hex Nut	8	
10	Position Indicator Assembly	1	
10A	Roll Pin	1	
10B	Pivot Pin	1	
10C	O-Ring (Pivot Pin)	1	
10D	Retaining Plate	1	
10E	O-Ring (Mounting Adapter)	1	
10F	Mounting Adapter	1	
10G	Magnet	1	
10H	Set Screw	1	

*Remarks
A: Items included in 3" Switching Valve Repair Kit.
B: Items included in 3" Switching Valve Replacement Kit.

CHART A			
VALVE SIZE	LOCKNUT	CONNECTOR	STUD
3"	1/2 - 20 UNF 40 - 45 ft-lbs	1/2 - 13 UNC 40 - 45 ft-lbs	3/4 - 10 UNC 30 ft-lbs

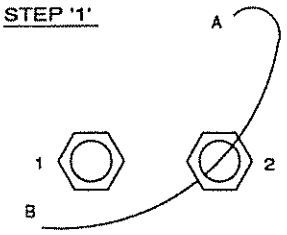


DETAIL 'A'

NOTE:

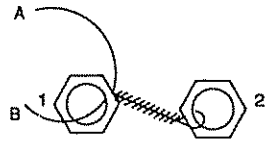
1. WIRE SHOULD BE TWISTED TIGHTLY AND WITHOUT SLACK. USE WIRE TWISTER PLIERS.

STEP '1'



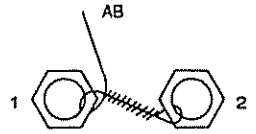
1. INSERT WIRE THROUGH CONNECTOR '2'

STEP '2'



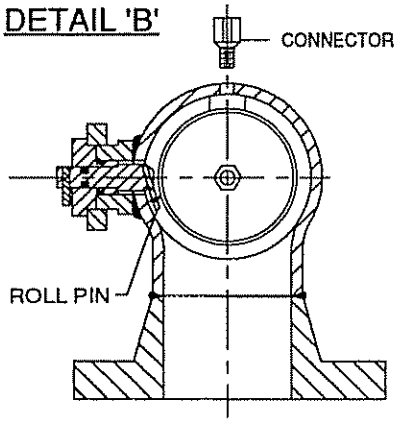
1. TWIST 'A' & 'B'
2. INSERT 'B' THROUGH CONNECTOR '1'

STEP '3'



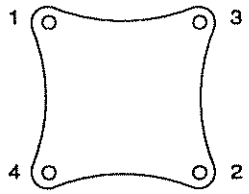
1. TWIST 'A' & 'B'

DETAIL 'B'

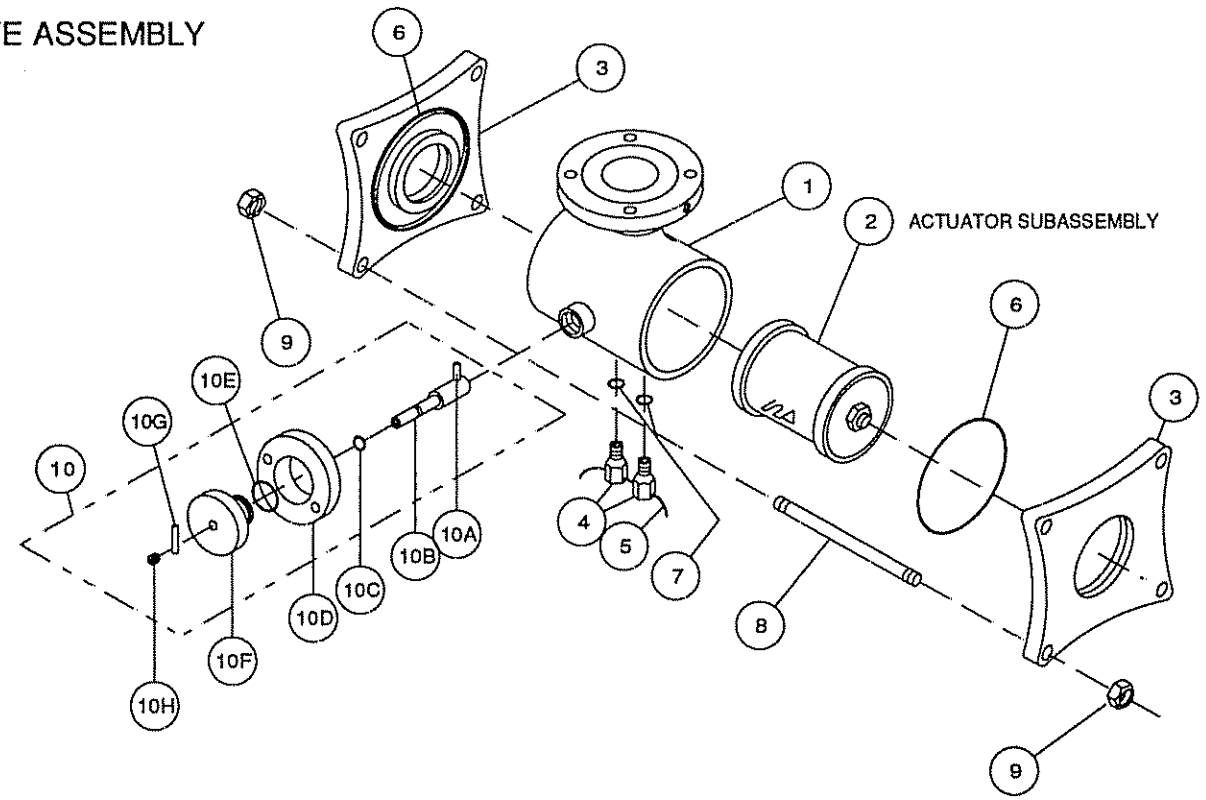


DETAIL 'C'

TORQUE SEQUENCE



VALVE ASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY & ACTUATOR SUBASSEMBLY

1. Place seals on piston.

   A) Insert O-ring.
   B) Using the seal installation tool, slide the piston seal over the piston. See shaft subassembly diagram.

   Note: If no installation tool is available, carefully stretch the piston seal over the piston using your thumb to press it in the groove.

2. Install O-rings on the shafts and connector, insert O-rings and rod scrapers in the shaft guides.

   Note: All O-rings should be lightly lubricated with silicone-based Parker O-Lube.

3. Disassemble/Build the shaft subassembly in the order shown by the shaft subassembly diagram.

   A) Clean and degrease all the threads on the shafts and the connector.
   B) Apply Loctite™ RC-620 to the threads of the connector and assemble.

   Note: Loctite™ RC-620 must be applied to the connector to prevent valve failure.

4. Disassemble/Build the actuator subassembly in the order shown by the actuator subassembly diagram.

   A) To install retaining rings, spread end and insert in groove, rotate until ring is completely in groove.
   B) Tighten locknuts to torque specified in Chart A.

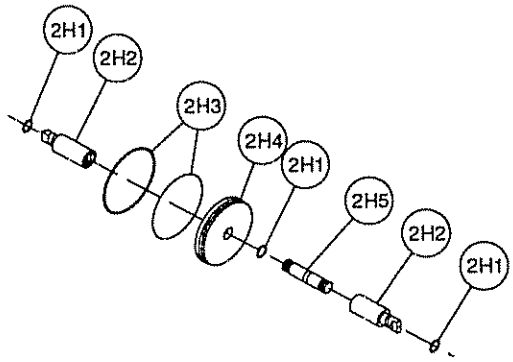
SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2H1	O-Ring (Poppet Shaft)	3	A, B
2H2	Poppet Shaft	2	B
2H3	Piston Seal	1	A, B
2H4	Valve Piston	1	B
2H5	Connector (Poppet Shaft)	1	B

*Remarks
A: Items included in 3" Switching Valve Repair Kit.
B: Items included in 3" Switching Valve Replacement Kit.

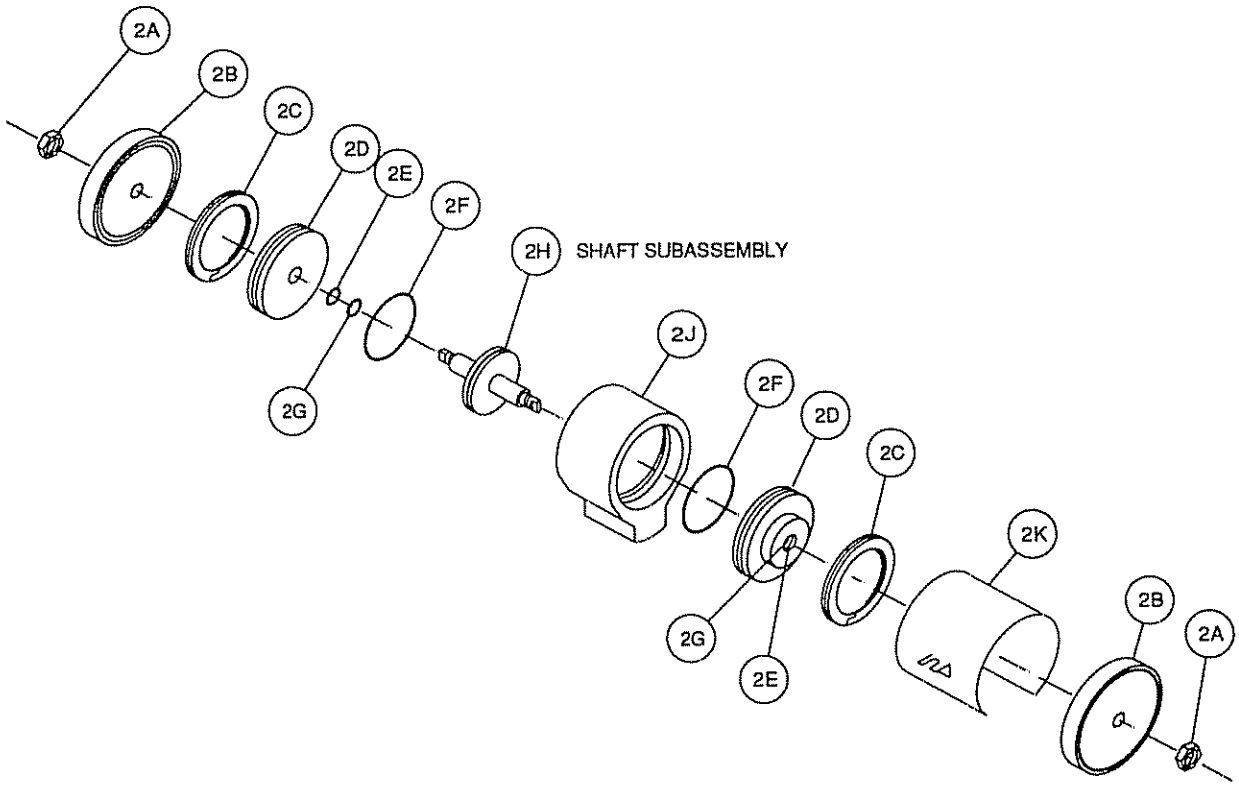
ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Locknut	2	A, B
2B	Valve Poppet	2	A, B
2C	Retaining Ring	2	A, B
2D	Shaft Guide	2	B
2E	Rod Scraper	2	A, B
2F	O-Ring (Shaft Guide)	2	A, B
2G	O-Ring	2	A, B
2H	Shaft Subassembly	1	
2J	Cylinder Block	1	B
2K	Dome Cover	1	B

*Remarks
A: Items included in 3" Switching Valve Repair Kit.
B: Items included in 3" Switching Valve Replacement Kit.

SHAFT SUBASSEMBLY



ACTUATOR SUBASSEMBLY



4.5 Switching Valve Disassembly/Assembly For Dryer Models 2500 Through 6400

WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Disconnect pilot air tubing and position indicator cables. Remove valve from the pipe manifolds.

2. Clean and inspect valve seats and poppets for damage and excessive wear. Use a mirror. Do not disassemble valve at this time. Manually apply pressure to the poppet and push it back and forth several times. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Build the valve position indicator in the order shown in the valve assembly diagram.

2. Disassemble/Build the valve assembly in the order shown in the valve assembly diagram.

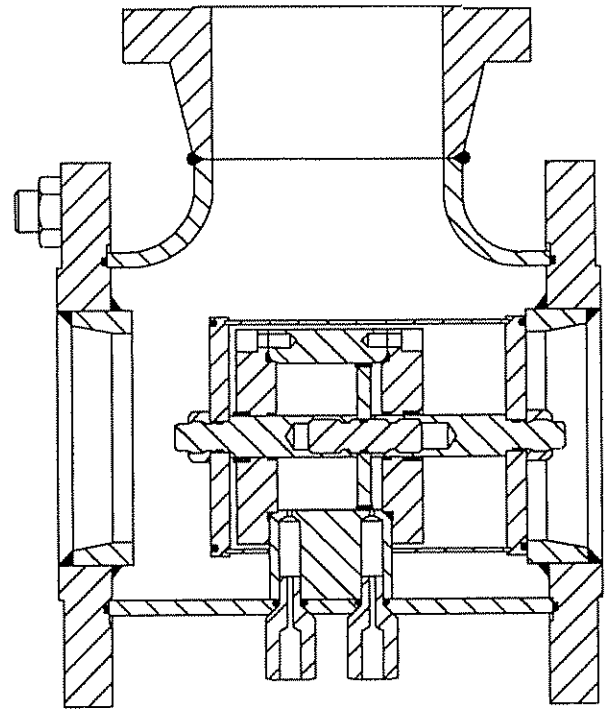
   A) Invert the valve body as shown in Detail B.
   B) Carefully insert the roll pin into the slot of the dome cover.
   C) Support the actuator subassembly, install the connectors.

      Note: O-rings should be lightly lubricated to prevent shearing.

   D) Tighten connectors to torque specified in Chart A.
   E) Lockwire connectors as shown in Detail A.
   F) Hand tighten studs in sequence shown in Detail C.
   G) Tighten studs in sequence to torque specified in Chart A.
   H) Test Valve.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Actuator Subassembly	1	
3	Valve Seat	2	
4	Connector	2	
5	Lockwire	1	A, B, C, D
6	O-Ring (Valve Body)	2	A, B, C, D
7	O-Ring (Connector)	2	A, B, C, D
8	Threaded Stud	4	
9	Hex Nut	8	
10	Position Indicator Assembly	1	
10A	Roll Pin	1	
10B	Pivot Pin	1	
10C	O-Ring (Pivot Pin)	1	
10D	Retaining Plate	1	
10E	O-Ring (Mounting Adapter)	1	
10F	Mounting Adapter	1	
10G	Magnet	1	
10H	Set Screw	1	

*Remarks
A: Items included in 4" Switching Valve Repair Kit.
B: Items included in 4" Switching Valve Replacement Kit.
C: Items included in 6" Switching Valve Repair Kit.
D: Items included in 6" Switching Valve Replacement Kit.

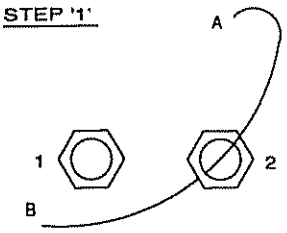


DETAIL 'A'

NOTE:

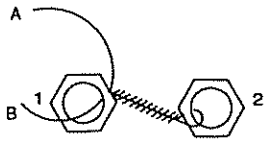
1. WIRE SHOULD BE TWISTED TIGHTLY AND WITHOUT SLACK. USE WIRE TWISTER PLIERS.

STEP '1'



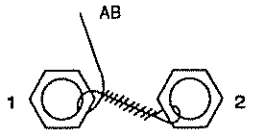
1. INSERT WIRE THROUGH CONNECTOR '2'

STEP '2'



1. TWIST 'A' & 'B'
2. INSERT 'B' THROUGH CONNECTOR '1'

STEP '3'



1. TWIST 'A' & 'B'

DETAIL 'B'

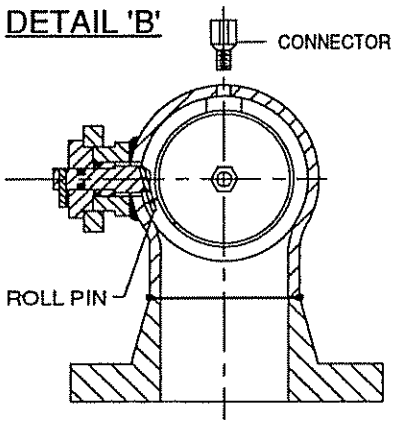
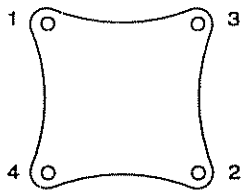


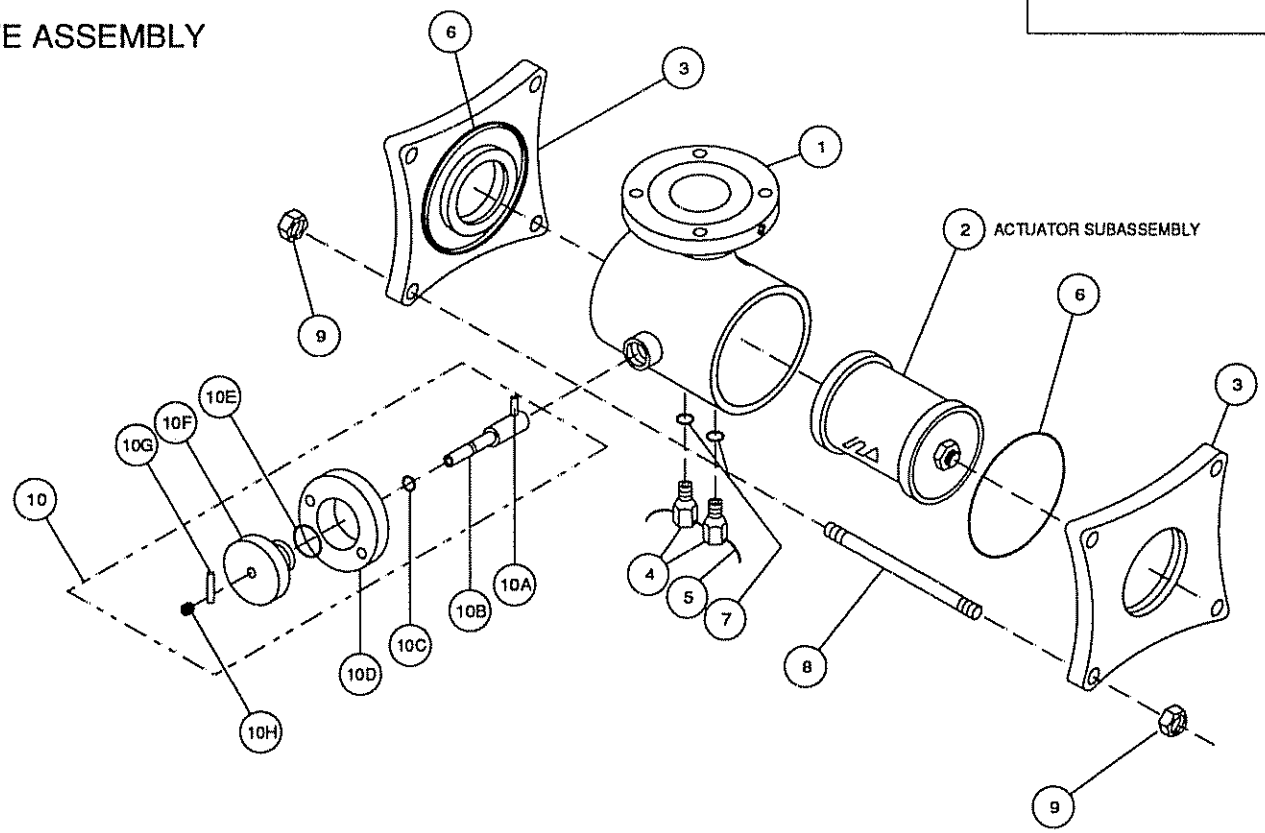
CHART A				
VALVE SIZE	LOCKNUT	CAP SCREW	STUD	CONNECTOR
4"	3/4-16 UNF 90-100 ft-lbs	1/2-20 UNC 40-60 in-lbs	3/4-10 UNC 30 ft-lbs	1/2-13 UNC 40 - 45 ft-lbs
6"	3/4-16 UNF 90-100 ft-lbs	5/16-18 UNC 96-120 in-lbs	1 - 8 UNC 65 ft-lbs	3/4-10 UNC 120-130 ft-lbs

DETAIL 'C'

TORQUE SEQUENCE



VALVE ASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY & ACTUATOR SUBASSEMBLY

1. Place seals on piston.

   A) Insert O-ring.
   B) Using the seal installation tool, slide the piston seal over the piston. See Shaft Subassembly Diagram.

   Note: If no installation tool is available, carefully stretch the piston seal over the piston using your thumb to press it in the groove.

2. Install O-rings on the shafts and connector, insert O-rings and rod scrapers in the shaft guides.

   Note: All O-rings should be lightly lubricated with silicone-based Parker O-Lube.

3. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.

   A) Clean and degrease all the threads on the shafts and the connector.
   B) Apply Loctite™ RC-620 to the threads of the connector and assemble.

   Note: Loctite™ RC-620 must be applied to the connector to prevent valve failure.

4. Disassemble/Build the actuator subassembly in the order shown by the Actuator Subassembly Diagram.

   A) Build cylinder block/shaft subassembly, insert cap screws, and tighten to torque specified in Chart A.
   B) Tighten locknuts to torque specified in Chart A.

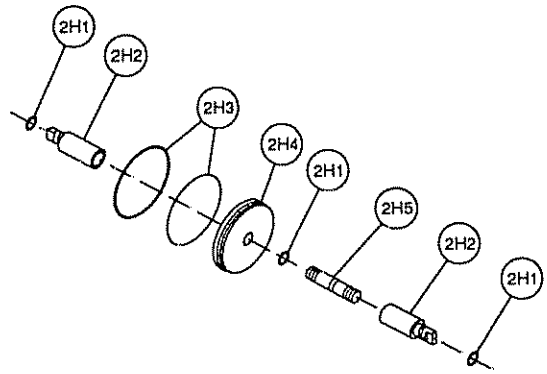
SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2H1	O-Ring (Poppet Shaft)	3	A, B, C, D
2H2	Poppet Shaft	2	B, D
2H3	Piston Seal	1	A, B, C, D
2H4	Valve Piston	1	B, D
2H5	Connector (Poppet Shaft)	1	B, D

*Remarks
A: Items included in 4" Switching Valve Repair Kit.
B: Items included in 4" Switching Valve Replacement Kit.
C: Items included in 6" Switching Valve Repair Kit.
D: Items included in 6" Switching Valve Replacement Kit.

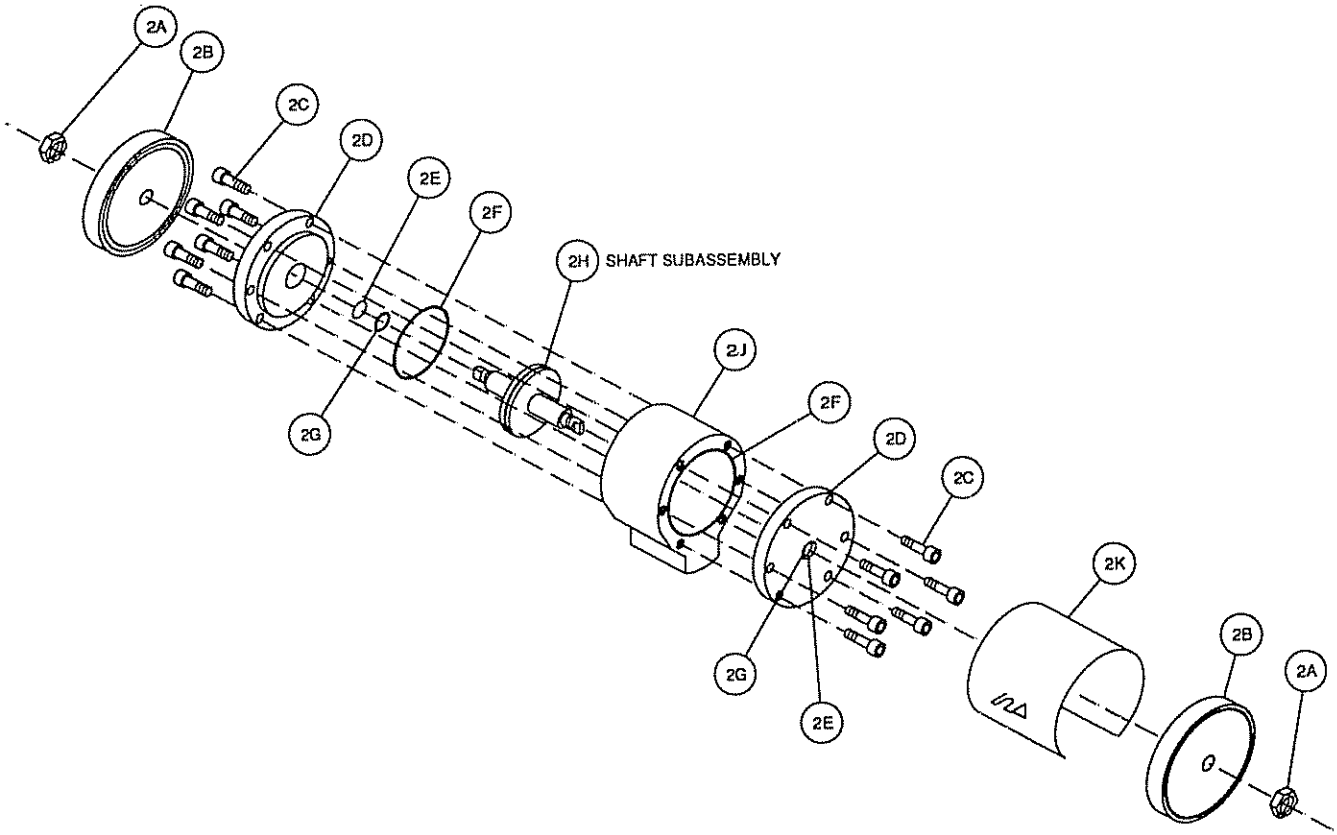
ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Locknut	2	A, B, C, D
2B	Valve Poppet	2	A, B, C, D
2C	Sockethead Cap Screw (4")	8	A, B
2C	Sockethead Cap Screw (6")	12	C, D
2D	Shaft Guide	2	B, D
2E	Rod Scraper	2	A, B, C, D
2F	O-Ring (Shaft Guide)	2	A, B, C, D
2G	O-Ring	2	A, B, C, D
2H	Shaft Subassembly	1	
2J	Cylinder Block	1	B, D
2K	Dome Cover	1	B, D

*Remarks
A: Items included in 4" Switching Valve Repair Kit.
B: Items included in 4" Switching Valve Replacement Kit.
C: Items included in 6" Switching Valve Repair Kit.
D: Items included in 6" Switching Valve Replacement Kit.

SHAFT SUBASSEMBLY



ACTUATOR SUBASSEMBLY



4.6 Switching Valve Disassembly/Assembly For Dryer Models 8100 Through 12100

WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

WARNING!
Do not apply pilot pressure to the valve without valve flanges and seats in place. Failure to have the valve flanges and seats in place when pilot pressure is applied may result in serious personal injury and/or equipment damage.

WARNING!
Keep personnel, foreign material and tools clear of the valve poppet and seat area when testing valve operation. Failure to do so may result in serious personnel injury and/or equipment damage.

1. Disconnect the pilot air tubing and remove the valve from the pipe manifolds.

2. Apply 40-45 PSIG air pressure to one of the pilot ports. The pilot ports are located within the thick edge of the ANSI flange mounted on the 3-way valve. The pilot port selector will open the nearest valve port.

3. A) Clean and inspect the valve seats and poppets for damage and excessive wear. Use a mirror and do not disassemble at this time.

   B) Pneumatically actuate the valve through all positions several times. Watch for any tendency to bind, erratic operations, and failure to make a complete closure.

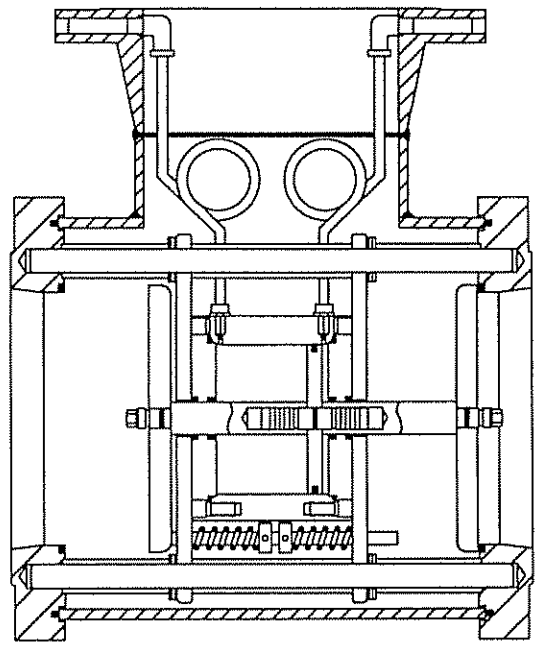
   C) If the valve operation, seat and poppet appear to be satisfactory, proceed to close and cap the open flange part with a tapped flange. Apply air pressure and leak check the valve.

4. A) If no problem has been experienced in step 3 above, it is recommended that the valve be placed back in service.

   B) If a problem has been experienced in step 3 above, refer to disassembly and reassembly instructions.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Actuator Subassembly	1	
2	Valve Body	1	
3	Valve Flange	2	
4	O-Ring (Valve Flange)	2	A, B, C, D
5	Connecting Rod	2	B, D
6	Spacer (Valve Flange)	4	B, D
7	Spacer (Actuator)	2	B, D
8	Spring Washer	12	A, B, C, D
9	Threaded Stud	4	
10	Hex Nut	8	
11	Tube Adapter (Actuator)	2	A, B, C, D
12	Tube Seamless (Pilot)	2	A, B, C, D
13	Tube Adapter (Valve Body)	2	A, B, C, D
14	O-Ring Seal Material	2	C
15	Position Indicator Assembly	1	
15A	Lever Arm With Pivot Pin	1	
15B	O-Ring (Pivot Pin)	1	A, B, C, D
15C	Retaining Plate	1	
15D	O-Ring (Mounting Adapter)	1	A, B, C, D
15E	Mounting Adapter	1	
15F	Magnet	1	
15G	Set Screw	1	

*Remarks
A: Items included in 8" Switching Valve Repair Kit.
B: Items included in 8" Switching Valve Replacement Kit.
C: Items included in 10" Switching Valve Repair Kit.
D: Items included in 10" Switching Valve Replacement Kit.



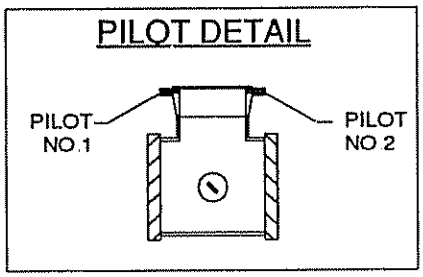
5. Disassemble/Build valve assembly as shown below.

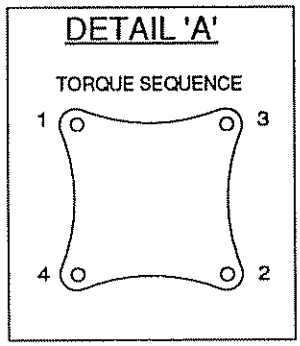
A) During reassembly, hand-tighten studs in the sequence shown in Detail A.

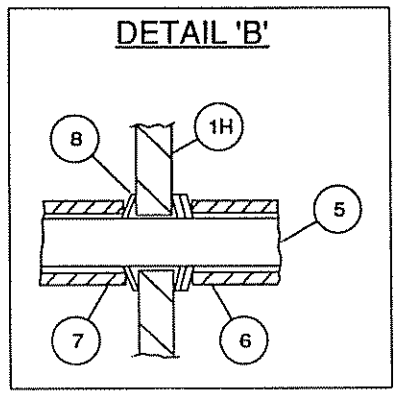
B) Tighten studs in sequence to the torque specifications in Chart A.

C) Test valve for leakage and watch for any erratic operation or tendency to bind.

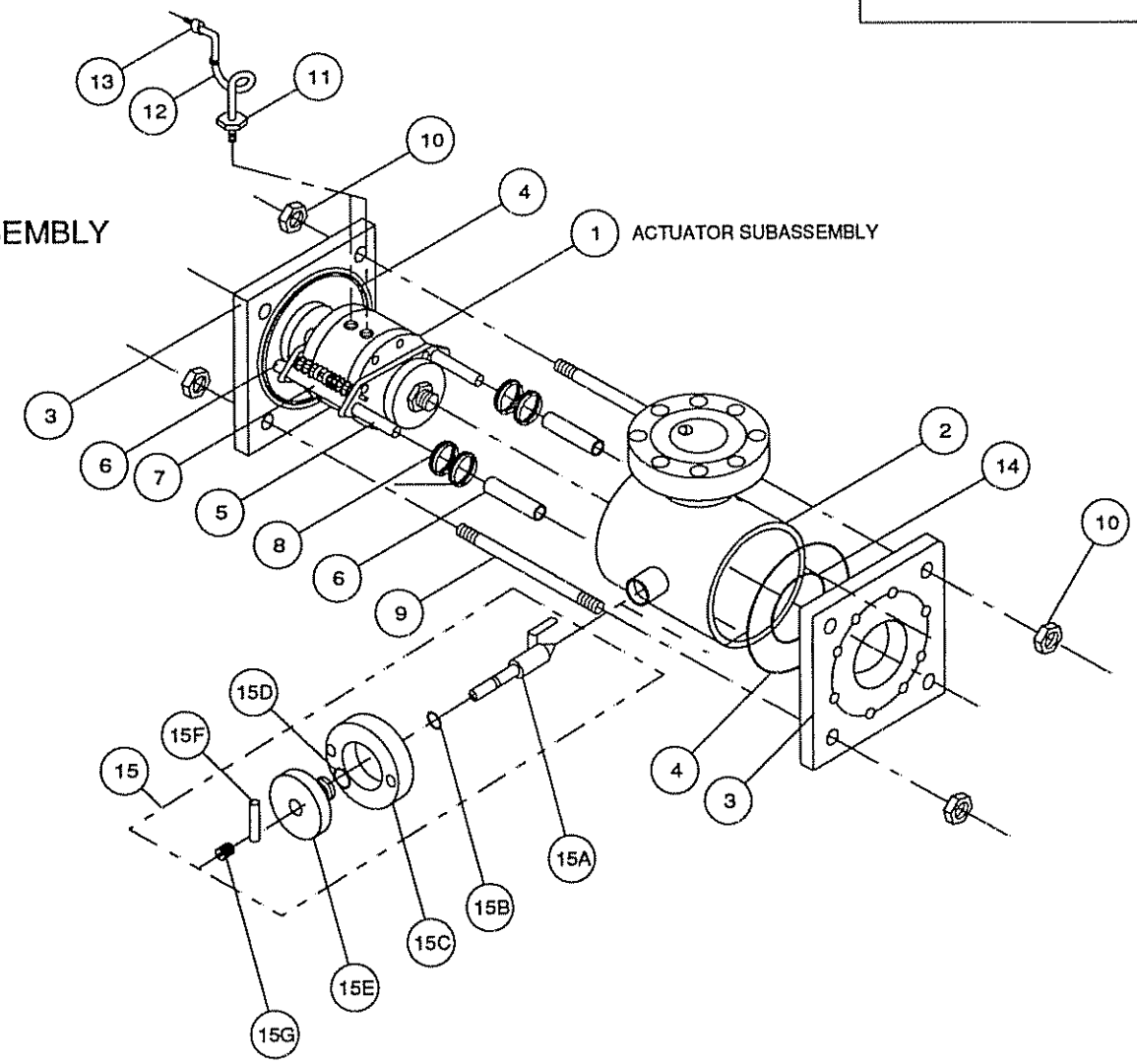
CHART A			
VALVE SIZE	LOCKNUT	CAP SCREW	STUD
8"	3/ -16 UNF 110-120 ft-lbs	5/16-18 UNC 120-130 in-lbs	1 - 8 UNC 100-120 ft-lbs
10"	3/4-16 UNF 110-120 ft-lbs	5/16-18 UNC 120-130 in-lbs	1 - 8 UNC 100-120 ft-lbs







VALVE ASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY & ACTUATOR SUBASSEMBLY

1. Place seals on piston.

   A) Insert O-ring.
   B) Using the seal installation tool, slide the piston seal over the piston. See Shaft Subassembly Diagram.

   Note: If no installation tool is available, carefully stretch the piston seal over the piston using your thumb to press it in the groove.

2. Install O-rings on the shafts and connector, insert O-rings and rod scrapers in the shaft guides.

   Note: All O-rings should be lightly lubricated with silicone-based Parker O-Lube.

3. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.
   A) Clean and degrease all the threads on the shafts and the connector.
   B) Apply Loctite™ RC-620 to the threads of the connector and assemble.

   Note: Loctite™ RC-620 must be applied to the connector to prevent valve failure.

4. Disassemble/Build the actuator subassembly in the order shown by the Actuator Subassembly Diagram.

   A) Build cylinder block/shaft sub assembly. Insert cap screws and tighten to torque specified in Chart A.
   B) Tighten locknuts to torque specified in Chart A.

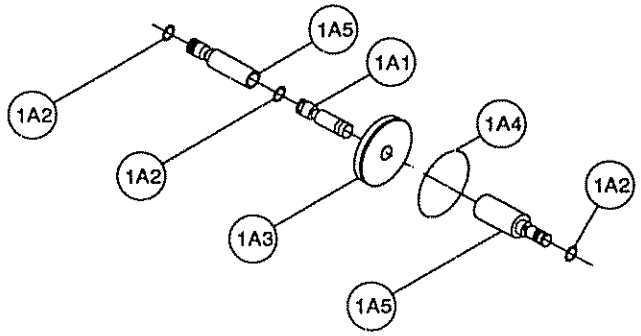
SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
1A1	Connector (Poppet Shaft)	1	B, D
1A2	O-Ring (Poppet Shaft)	3	A, B, C, D
1A3	Valve Piston	1	B, D
1A4	Piston Seal	1	A, B, C, D
1A5	Poppet Shaft	2	A, B

*Remarks
A: Items included in 8" Switching Valve Repair Kit.
B: Items included in 8" Switching Valve Replacement Kit.
C: Items included in 10" Switching Valve Repair Kit.
D: Items included in 10" Switching Valve Replacement Kit.

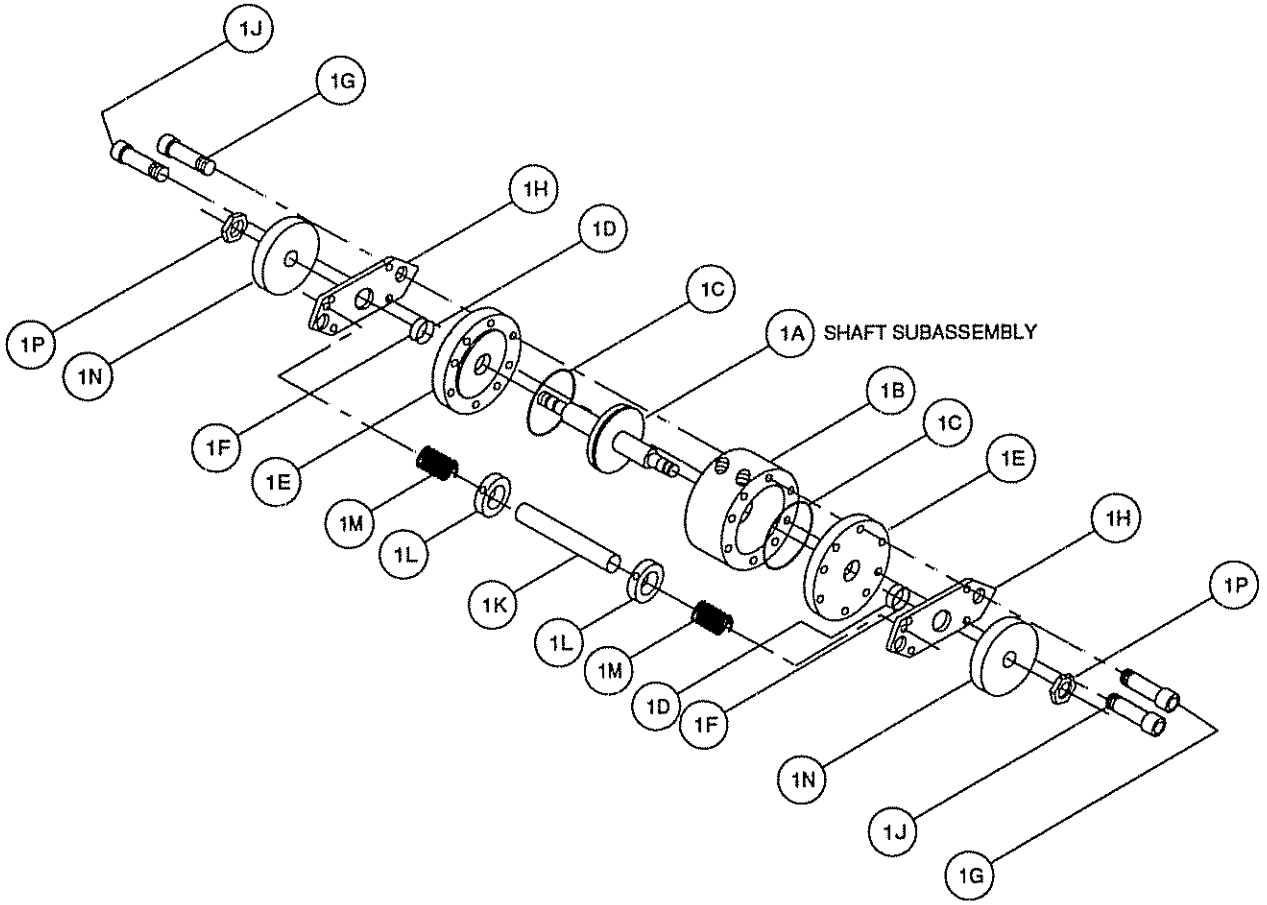
ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
1A	Shaft Subassembly	1	
1B	Cylinder Block	1	B, D
1C	O-Ring (Cylinder Block)	2	A, B, C, D
1D	Rod Seal (Shaft Guide)	2	A, B, C, D
1E	Shaft Guide	2	B, D
1F	Rod Scraper (Shaft Guide)	2	A, B, C, D
1G	Sockethead Cap Screw (8")	4	A, B
	Sockethead Cap Screw (10")	8	C, D
1H	Support Bracket	2	B, D
1J	Sockethead Cap Screw	8	A, B, C, D
1K	Actuator Link	1	
1L	Ring Guide (Actuator Link)	2	
1M	Compression Spring	2	
1N	Valve Poppet	2	
1P	Locknut (Valve Poppet)	2	A, B, C, D

*Remarks
A: Items included in 8" Switching Valve Repair Kit.
B: Items included in 8" Switching Valve Replacement Kit.
C: Items included in 10" Switching Valve Repair Kit.
D: Items included in 10" Switching Valve Replacement Kit.

SHAFT SUBASSEMBLY



ACTUATOR SUBASSEMBLY



4.7 Purge Exhaust Valve Disassembly/Assembly For Dryer Models 1600 Through 8100

WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

WARNING!
Do not apply pilot pressure to the valve without valve flanges and seats in place. Failure to have the valve flanges and seats in place when pilot pressure is applied may result in serious personal injury and/or equipment damage.

WARNING!
Keep personnel, foreign material and tools clear of the valve poppet and seat area when testing valve operation. Failure to do so may result in serious personnel injury and/or equipment damage.

1. Disconnect pilot air tubing and remove valve from the pipe manifolds.

2. Clean and inspect valve seats and poppets for damage and excessive wear. Use mirror. Do not disassemble the valve at this time. Manually apply pressure to the poppet and push it back and forth several times. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

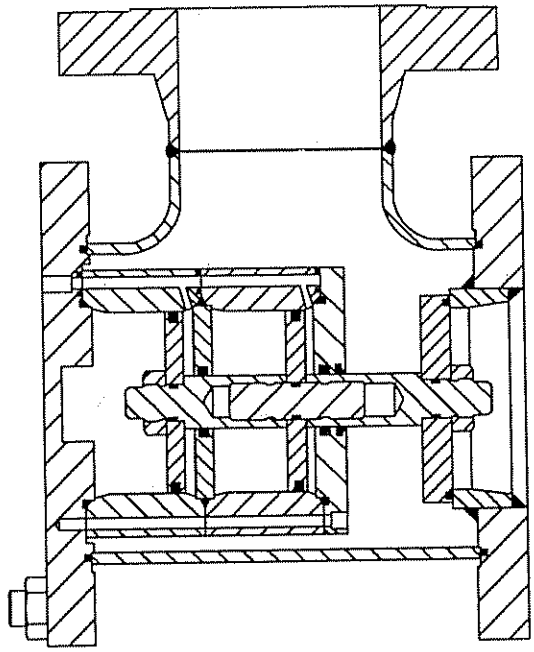
DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Build valve assembly as shown in the Valve Assembly Diagram.

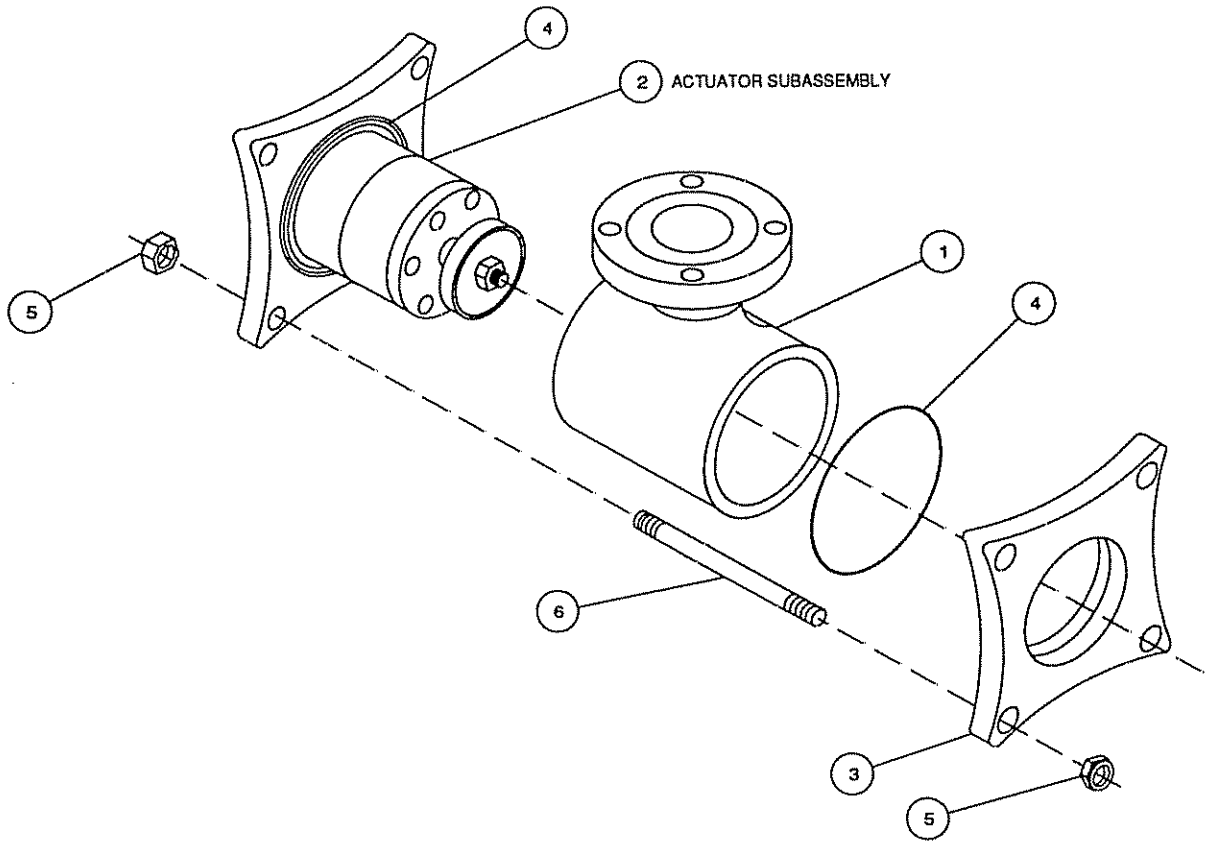
   A) Hand tighten studs in sequence shown in Detail D.
   B) Tighten studs in sequence shown to torque specified in Chart A.
   C) Leak check valve.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Actuator Subassembly	1	
3	Valve Seat	1	
4	O-Ring (Valve Body)	2	A, B, C, D, E, F
5	Hex Nut	8	
6	Threaded Stud	4	

*Remarks
A: Items included in 3" Purge Exhaust Valve Repair Kit.
B: Items included in 3" Purge Exhaust Valve Replacement Kit.
C: Items included in 4" Purge Exhaust Valve Repair Kit.
D: Items included in 4" Purge Exhaust Valve Replacement Kit.
E: Items included in 6" Purge Exhaust Valve Repair Kit.
F: Items included in 6" Purge Exhaust Valve Replacement Kit.



VALVE ASSEMBLY



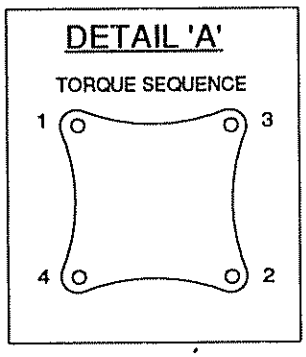


CHART A			
VALVE SIZE	LOCKNUT	CAP SCREW	STUD
3"	1/2-20 UNF 40-45 ft-lbs	1/4-20 UNC 60-75 in-lbs	3/4-10 UNC 30 ft-lbs
4"	3/4-16 UNF 110-120 ft-lbs	1/4-20 UNC 60-75 in-lbs	3/4-10 UNC 30 ft-lbs
6"	3/4-16 UNF 110-120 ft-lbs	5/16-18 UNC 120-130 in-lbs	1 - 8 UNC 65 ft-lbs

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY & ACTUATOR SUBASSEMBLY

1. Place seals on pistons.
   A) Insert O-ring.
   B) Using the seal installation tool, slide the piston seal over the piston. See Shaft Subassembly Diagram.

   Note: If no installation tool is available, carefully stretch the piston seal over the piston using your thumbs to press it in the groove.

2. Insert O-rings on the connector, shafts, and in the shaft guides.

   Note: All O-rings should be LIGHTLY lubricated with silicone-based Parker O-Lube for ease of assembly.

3. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.
   A) Clean and degrease all the threads on the shafts and the connector.
   B) Apply Loctite™ RC-620 to the threads of the connector and assemble.

   Note: Loctite™ RC-620 must be applied to the connector to prevent valve failure.

   C) Tighten locknut to torque specified in Chart A.

4. Disassemble/Build the actuator assembly in the order shown by the Actuator Subassembly Diagram.
   A) Apply Loctite™ RC-620 to the threads of the cap screws. Insert the cap screws and tighten to the torque specified in Chart A.
   B) Tighten locknut to torque specified in Chart A.

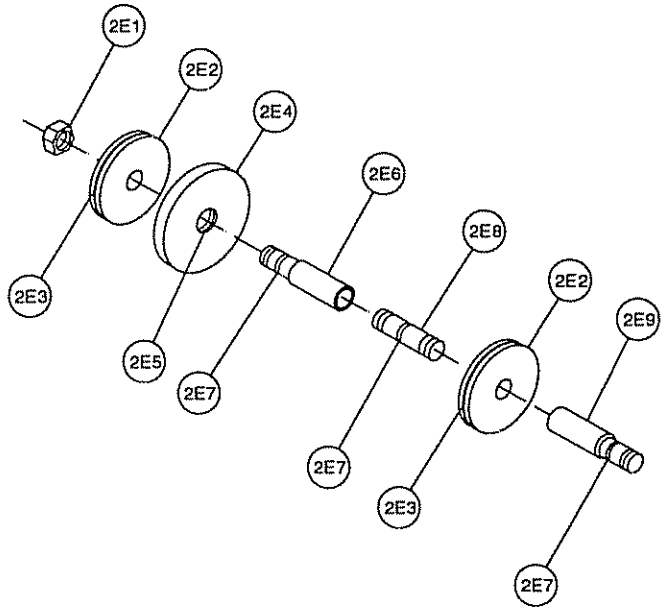
SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2E1	Locknut	1	A, B, C, D, E, F
2E2	Valve Piston	2	B, D, F
2E3	Piston Seal	2	A, B, C, D, E, F
2E4	Shaft Guide	1	B, D, F
2E5	O-Ring (Shaft Guide)	1	A, B, C, D, E, F
2E6	Poppet Shaft (Short)	1	B, D, F
2E7	O-Ring	3	A, B, C, D, E, F
2E8	Connector	1	B, D, F
2E9	Poppet Shaft (Long)	1	B, D, F

*Remarks
A: Items included in 3" Purge Exhaust Valve Repair Kit.
B: Items included in 3" Purge Exhaust Valve Replacement Kit.
C: Items included in 4" Purge Exhaust Valve Repair Kit.
D: Items included in 4" Purge Exhaust Valve Replacement Kit.
E: Items included in 6" Purge Exhaust Valve Repair Kit.
F: Items included in 6" Purge Exhaust Valve Replacement Kit.

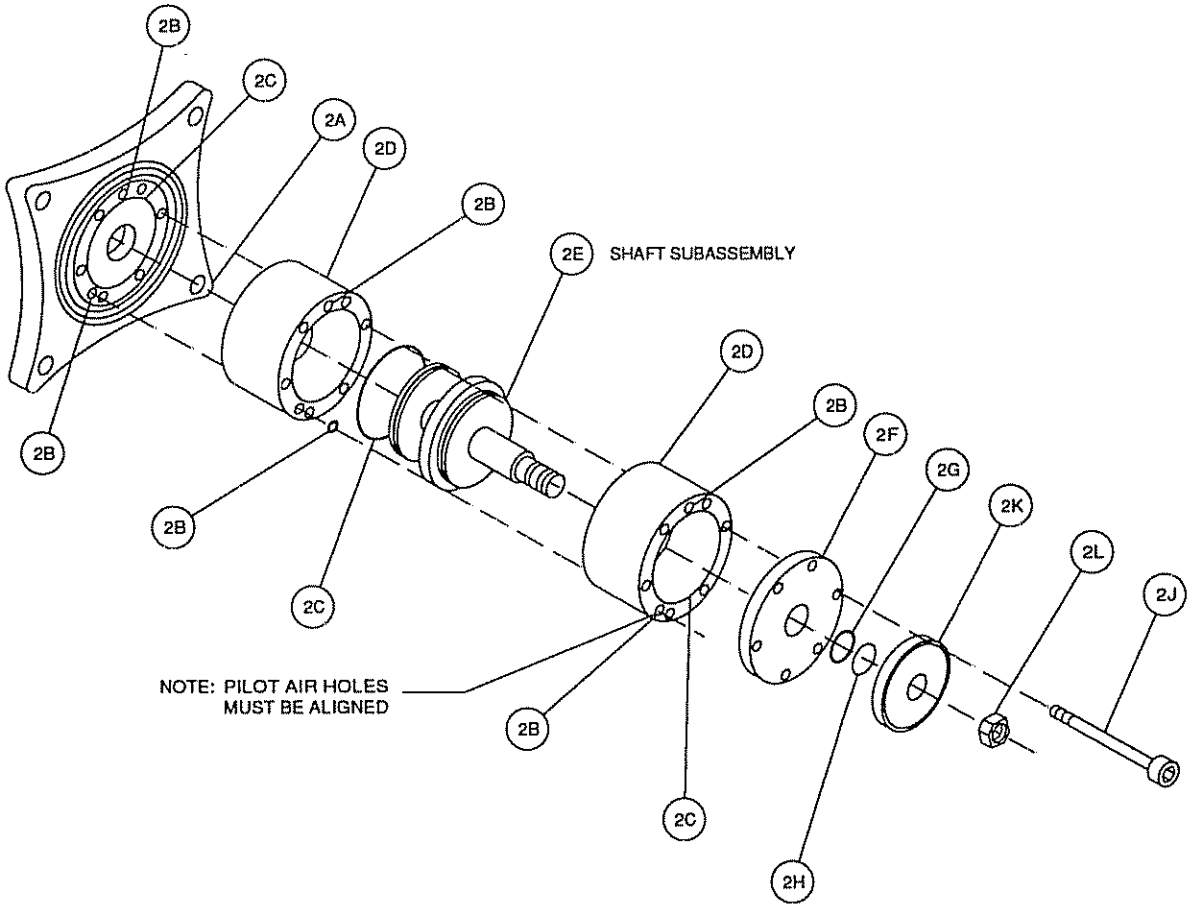
ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Valve Flange	1	
2B	O-Ring	6	A, B, C, D, E, F
2C	O-Ring	3	A, B, C, D, E, F
2D	Cylinder Block	2	B, D, F
2E	Shaft Subassembly	1	
2F	Shaft Guide	1	B, D, F
2G	O-Ring (Shaft Guide)	1	A, B, C, D, E, F
2H	Rod Scraper (Shaft Guide)	1	A, B, C, D, E, F
2J	Sockethead Cap Screw	6	A, B, C, D, E, F
2K	Valve Poppet	1	A, B, C, D, E, F
2L	Locknut	1	A, B, C, D, E, F

*Remarks
A: Items included in 3" Purge Exhaust Valve Repair Kit.
B: Items included in 3" Purge Exhaust Valve Replacement Kit.
C: Items included in 4" Purge Exhaust Valve Repair Kit.
D: Items included in 4" Purge Exhaust Valve Replacement Kit.
E: Items included in 6" Purge Exhaust Valve Repair Kit.
F: Items included in 6" Purge Exhaust Valve Replacement Kit.

SHAFT SUBASSEMBLY



ACTUATOR SUBASSEMBLY



4.8 Purge Exhaust Valve Disassembly/Assembly For Dryer Models 10000 Through 12100

WARNING!
Ensure that the dryer and any associated prefilter and afterfilter are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

WARNING!
Do not apply pilot pressure to the valve without valve flanges and seats in place. Failure to have the valve flanges and seats in place when pilot pressure is applied may result in serious personal injury and/or equipment damage.

WARNING!
Keep personnel, foreign material and tools clear of the valve poppet and seat area when testing valve operation. Failure to do so may result in serious personnel injury and/or equipment damage.

1. Disconnect the pilot air tubing and remove the valve from the pipe manifolds.

2. Apply 40 to 45 PSIG air pressure to the 1/4 inch NPT Exhaust port, located on the centerline of the Valve Flange, item 1B of the Actuator Subassembly. This will pilot the valve open.

3. A) Clean and inspect the valve seats and poppets for damage and excessive wear. Use a mirror and do not disassemble the valve at this time.

   B) Pneumatically actuate the valve from open to closed and closed to open. Watch for any tendency to bind, erratic operations, and failure to make a complete closure.

   C) If the valve operation, seat and poppet appear to be satisfactory, proceed to close and cap the open flange part with a tapped flange. Apply air pressure and leak check the valve.

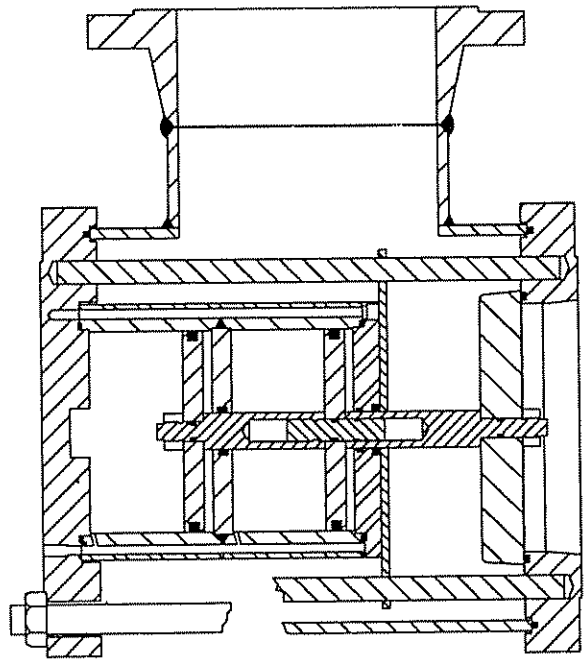
4. A) If no problem has been experienced in step 3 above it is recommended that the valve be placed back in service.

   B) If a problem has been experienced in step 3 above, refer to disassembly and reassembly instructions.

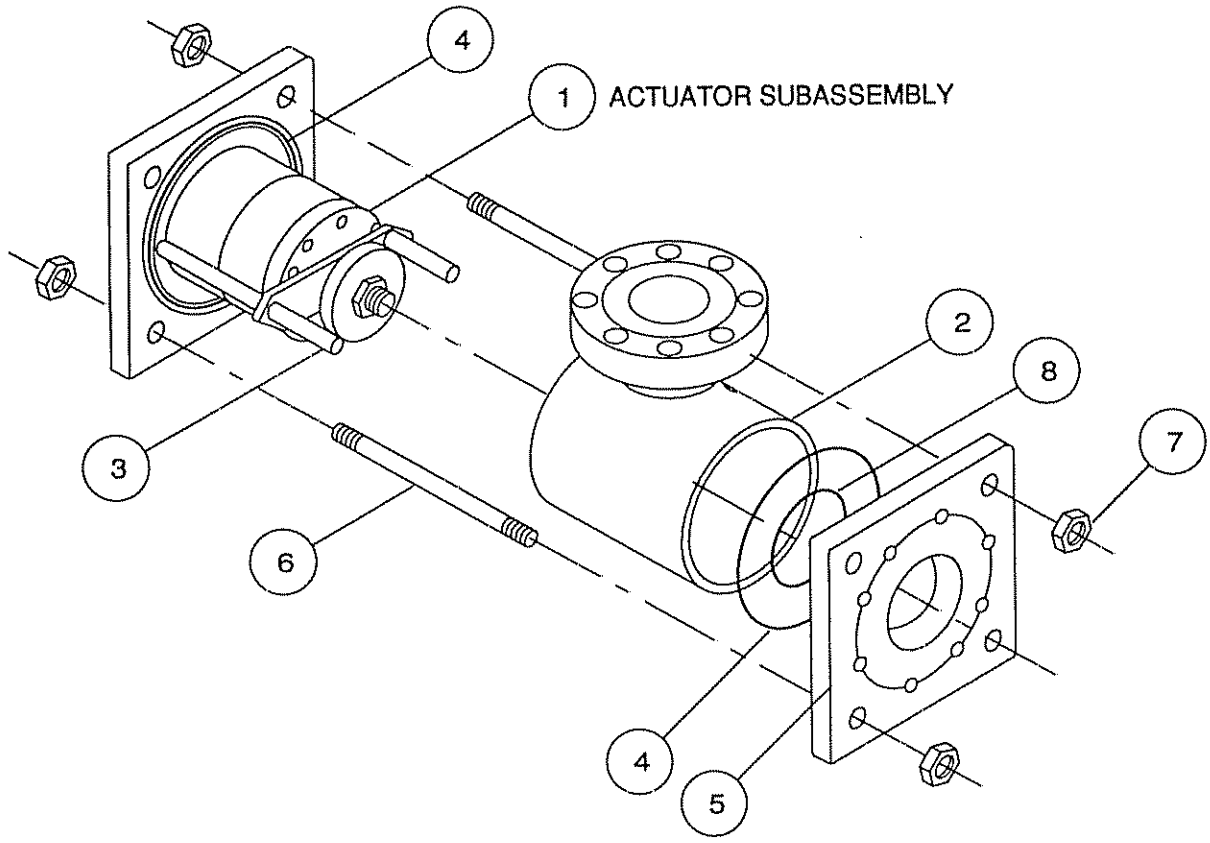
VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Actuator Subassembly	1	
2	Valve Body	1	
3	Connecting Rod	2	B
4	O-Ring (Valve Body)	2	A, B
5	Valve Flange	1	B
6	Threaded Stud	4	
7	Hex Nut	8	
8	O-Ring Seal Material	1	

*Remarks
A: Items included in 8" Purge Exhaust Valve Repair Kit.
B: Items included in 8" Purge Exhaust Valve Replacement Kit.

CHART A			
VALVE SIZE	LOCKNUT	CAP SCREW	STUD
8"	3/4-16 UNF 110-120 ft-lbs	5/16-18 UNC 120-130 in-lbs	1 - 8 UNC 100-120 ft-lbs



VALVE ASSEMBLY

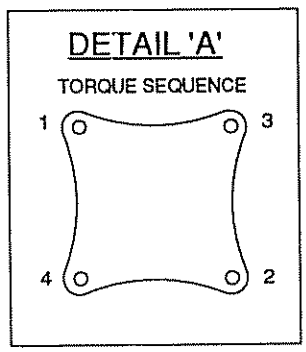


DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Stand valve upright on the operator flange with poppet side facing up.

2. Disassemble or assemble as shown. To assemble:

   A) Hand tighten studs in sequence shown in Detail "A" and tighten nuts and studs to torque specified in Chart A.



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

ACTUATOR SUBASSEMBLY

1. Disassemble/Build the actuator assembly in the order shown by the Actuator Subassembly Diagram.

   A) Apply Loctite™ RC-620 to the threads of the cap screws. Insert the cap screws and tighten to the torque specified in Chart A.

   B) Tighten locknut to torque specified in Chart A.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY

1. Disassemble/Build the shaft subassembly in the order shown.

   A) Clean and degrease all threads on the shafts and the connector.

   B) Apply Loctite™ RC-620 to the threads of the connector and assemble.

   Note: Loctite™ RC-620 must be applied to prevent valve failure.

   C) Tighten locknut to torque specified in Chart A.

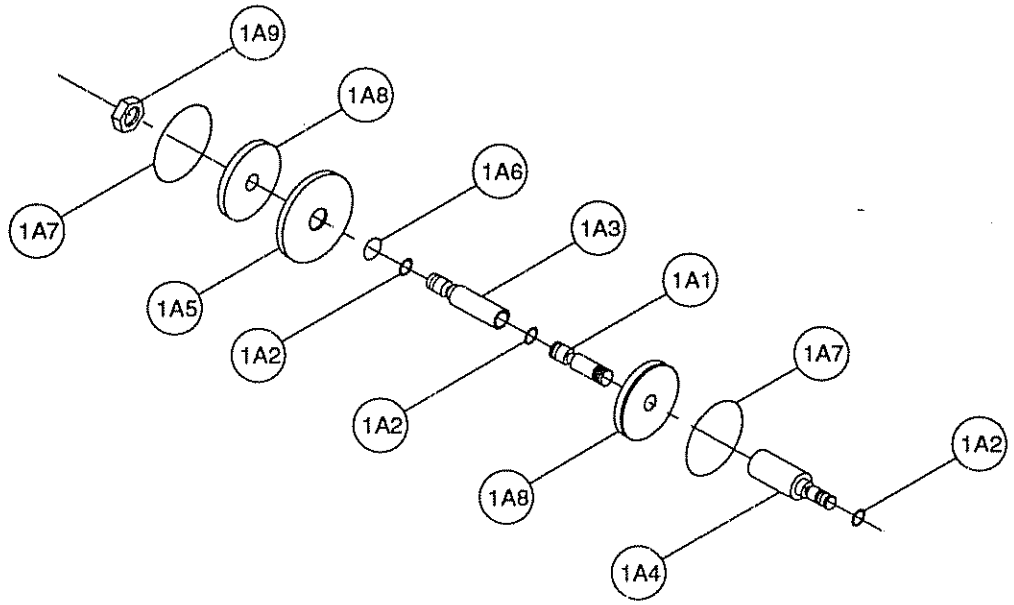
SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
1A1	Connector	3	B
1A2	O-Ring	2	A, B
1A3	Poppet Shaft (Short)	1	B
1A4	Poppet Shaft (Long)	1	B
1A5	Shaft Guide	1	B
1A6	Rod Seal (Shaft Guide)	1	A, B
1A7	Piston Seal	1	A, B
1A8	Valve Piston	1	B
1A9	Locknut (Poppet Shaft - Short)	1	A, B

*Remarks
A: Items included in 8" Purge Exhaust Valve Repair Kit.
B: Items included in 8" Purge Exhaust Valve Replacement Kit.

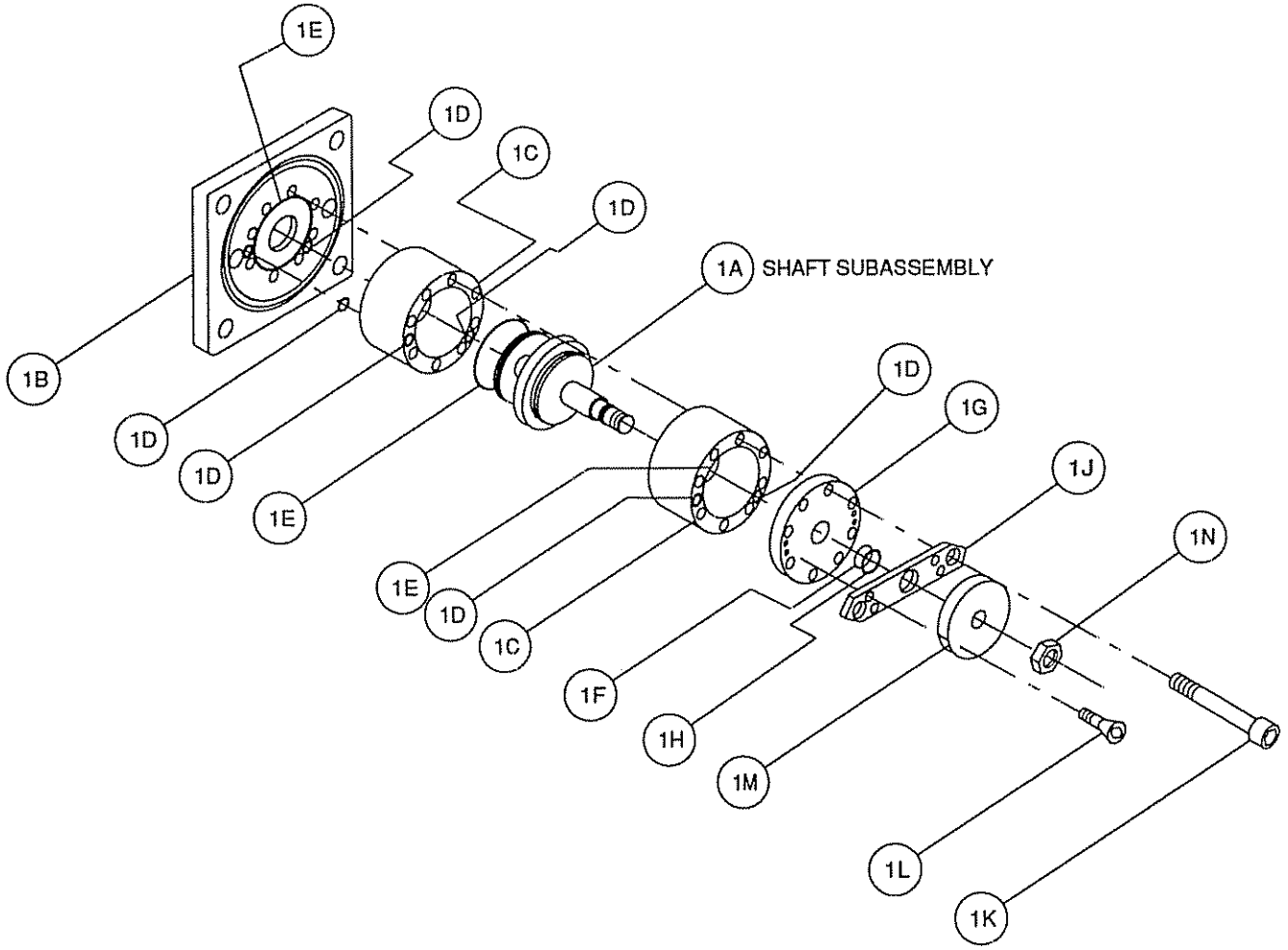
ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
1A	Shaft Subassembly	1	
1B	Valve Flange (Pilot End)	1	
1C	Cylinder Block	2	B
1D	O-Ring (Cylinder Block)	6	A, B
1E	O-Ring (Cylinder Block)	3	A, B
1F	Rod Seal (Shaft Guide)	1	A, B
1G	Shaft Guide	1	B
1H	Rod Scraper (Shaft Guide)	1	A, B
1J	Support Bracket	1	B
1K	Sockethead Cap Screw	8	A, B
1L	Sockethead Cap Screw	4	A, B
1M	Valve Poppet	1	
1N	Locknut	1	A, B

*Remarks
A: Items included in 8" Purge Exhaust Valve Repair Kit.
B: Items included in 8" Purge Exhaust Valve Replacement Kit.

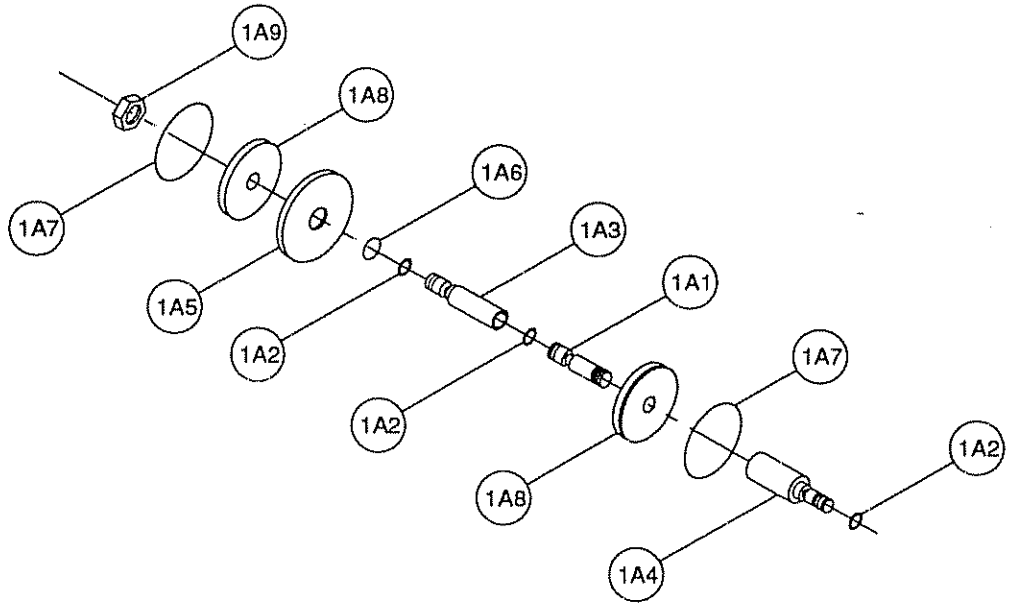
SHAFT SUBASSEMBLY



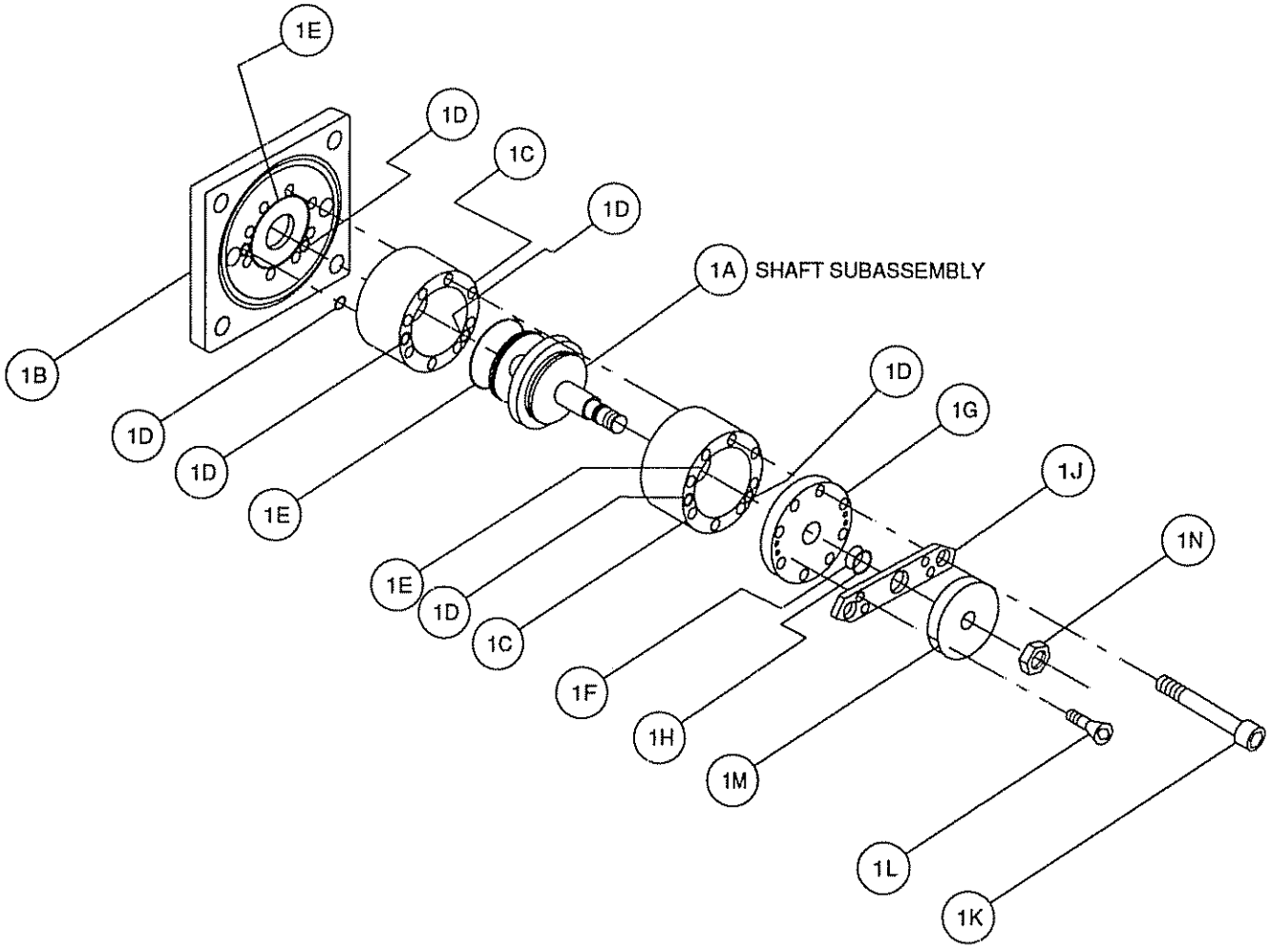
ACTUATOR SUBASSEMBLY



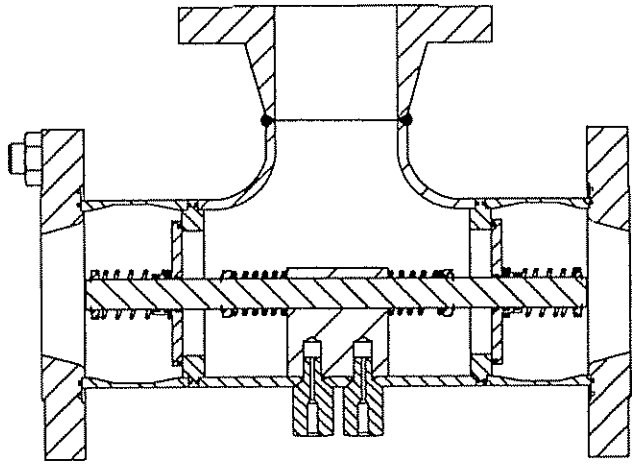
SHAFT SUBASSEMBLY



ACTUATOR SUBASSEMBLY



4.9 Check Valve Disassembly/Assembly For Dryer Models 1600 Through 4900



WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Clean and inspect valve seats and poppets for damage and excessive wear. Use a mirror. Do not disassemble the valve at this time. Manually apply pressure to the poppets. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

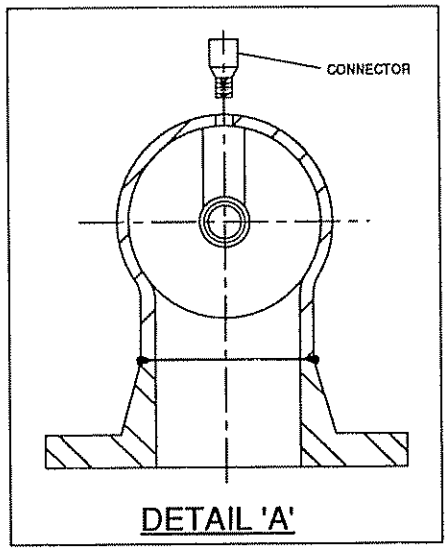
DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Assemble the valve body and internal components.

   Note: All O-rings and gaskets should be LIGHTLY lubricated with silicone-based Parker O-Lube for ease of assembly.

   A) Invert valve body as shown in Detail A.
   B) Support the shaft subassembly and install the connectors.
   C) Tighten connectors to torque specified in Chart A.
   D) Lockwire connectors as shown in Detail B.
   E) Install the rod scrapers and guide sleeves in the valve poppets.
   F) Install ring gaskets, valve seats, valve poppets, springs, spring retainers and retaining rings.
   G) Check valve poppet for freedom of movement. Pull back the poppet until contact is made with the spring retainer and release.

CHART A		
VALVE SIZE	CONNECTOR	STUD
3"	1/2 - 13 UNC 40 - 45 ft-lbs	3/4 - 10 UNC 30 ft-lbs
4"	1/2 - 13 UNC 40 - 45 ft-lbs	3/4 - 10 UNC 30 ft-lbs



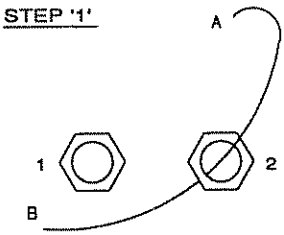
DETAIL 'A'

DETAIL 'B'

NOTE:

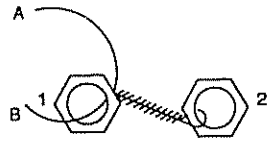
1. WIRE SHOULD BE TWISTED TIGHTLY AND WITHOUT SLACK. USE WIRE TWISTER PLIERS.

STEP '1'



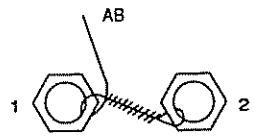
1. INSERT WIRE THROUGH CONNECTOR '2'

STEP '2'



1. TWIST 'A' & 'B'
2. INSERT 'B' THROUGH CONNECTOR '1'

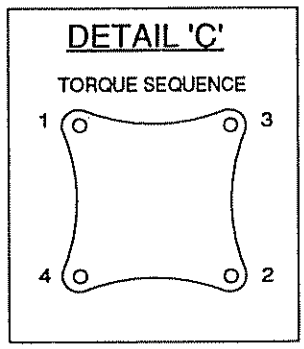
STEP '3'



1. TWIST 'A' & 'B'

2. Disassemble/Build the valve assembly as shown in the Valve Assembly Diagram.

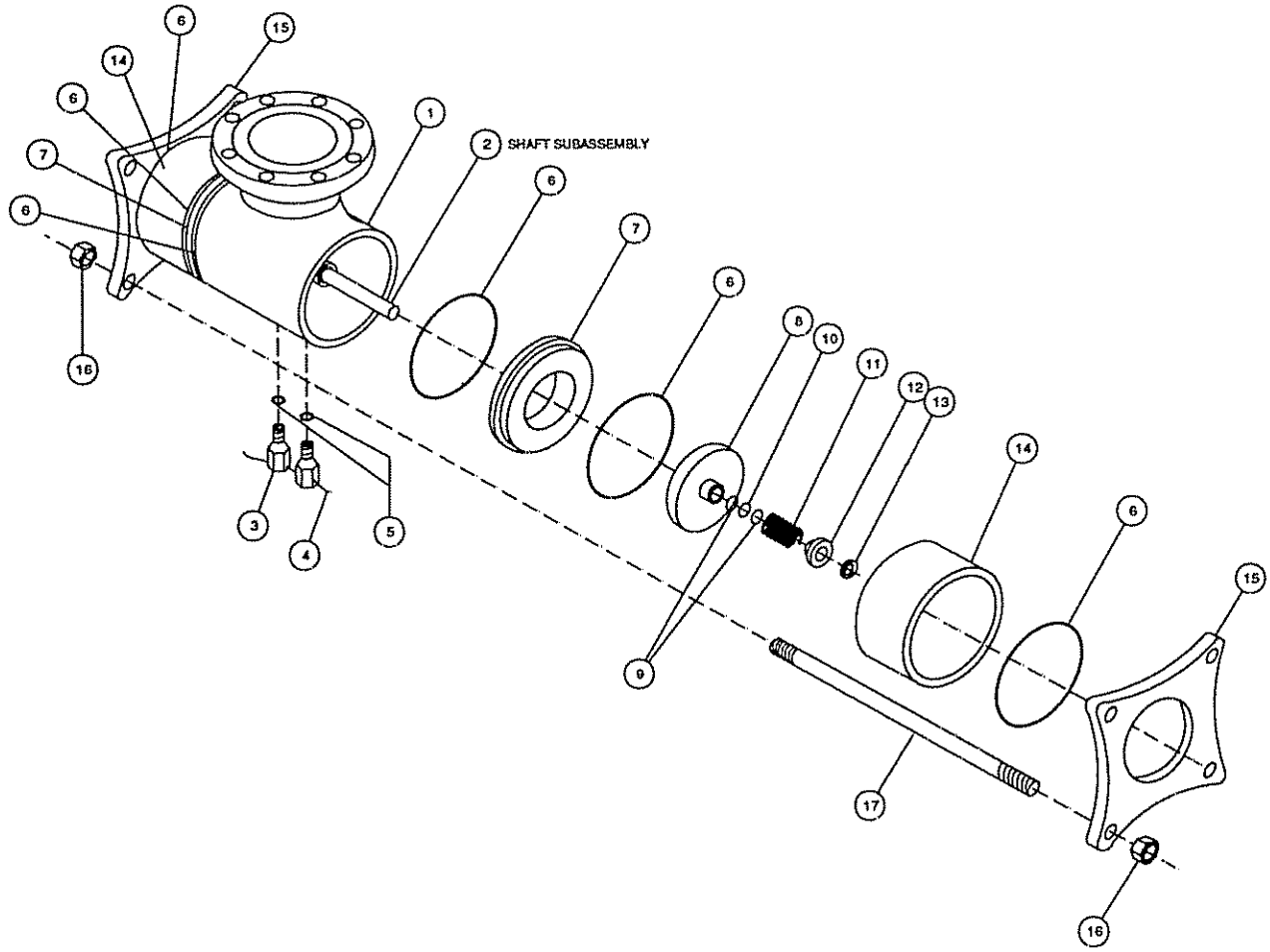
   A) Hand tighten studs in sequence shown in Detail C.
   B) Tighten studs in sequence shown to torque specified in Chart A.
   C) Leak check valve.



VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Shaft Subassembly	1	
3	Connector	2	
4	Lockwire (Connector)	1	A, B, C, D
5	O-Ring (Connector)	2	A, B, C, D
6	O-Ring (Valve Body)	6	A, B, C, D
7	Valve Seat	2	B, D
8	Valve Poppet	2	A, B, C, D
9	Rod Scraper (Valve Poppet)	4	A, B, C, D
10	Guide Sleeve (Valve Poppet)	2	A, B, C, D
11	Compression Spring	2	A, B, C, D
12	Spring Retainer	2	A, B, C, D
13	Retaining Ring	2	A, B, C, D
14	Cylinder Bonnet	2	
15	Valve Flange	2	
16	Hex Nut	8	
17	Threaded Stud	4	

*Remarks
A: Items included in 3" Purge Check Valve Repair Kit.
B: Items included in 3" Purge Check Valve Replacement Kit.
C: Items included in 4" Purge Check Valve Repair Kit.
D: Items included in 4" Purge Check Valve Replacement Kit.

VALVE ASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY

1. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.

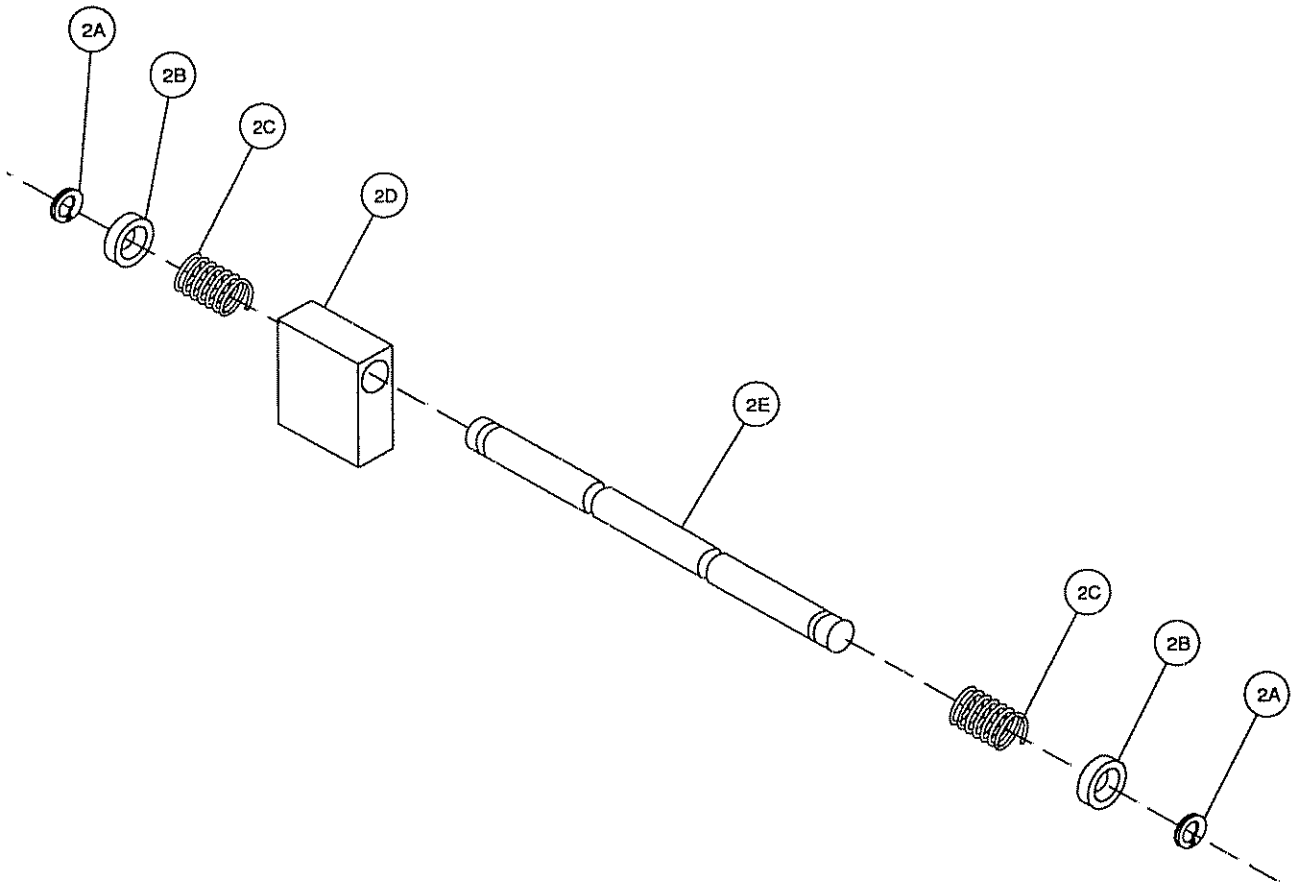
   A) Install the second retaining ring by compressing the assembly using a close fitting arbor, press as show in Detail D.

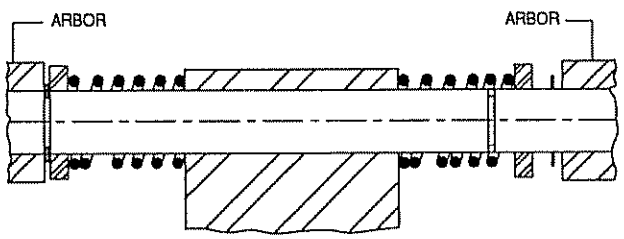
   Note: Disassembly of this component is not recommended if proper tools are not available for reassembly.

SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Retaining Ring	2	A, B, C, D
2B	Spring Retainer	2	A, B, C, D
2C	Compression Spring	2	A, B, C, D
2D	Support Block	1	B, D
2E	Poppet Shaft	1	B, D

*Remarks
A: Items included in 3" Purge Check Valve Repair Kit.
B: Items included in 3" Purge Check Valve Replacement Kit.
C: Items included in 4" Purge Check Valve Repair Kit.
D: Items included in 4" Purge Check Valve Replacement Kit.

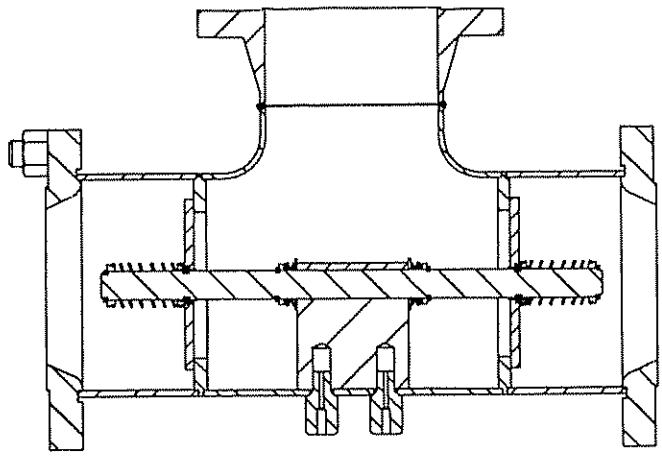
SHAFT SUBASSEMBLY





DETAIL 'D'

4.10 Check Valve Disassembly/Assembly For Dryer Models 6400 Through 8100



WARNING!
Ensure that the dryer and any associated prefilter and afterfilter are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

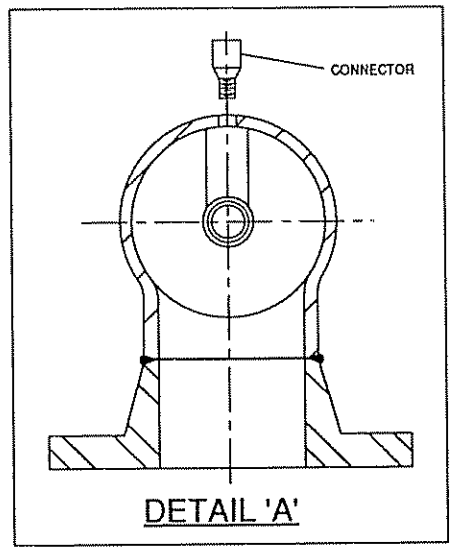
1. Clean and inspect valve seats and poppets for damage and excessive wear. Use a mirror. Do not disassemble the valve at this time. Manually apply pressure to the poppets. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Assemble the valve body and internal components

   Note: All O-rings and gaskets should be lightly lubricated with silicone-based Parker O-Lube for ease of assembly.
   A) Invert valve body as shown in Detail A.
   B) Support the shaft subassembly and install the connectors.
   C) Tighten connectors to torque specified in Chart A.
   D) Lockwire connectors as shown in Detail B.
   E) Install the rod scrapers and guide sleeves in the valve poppets.
   F) Install ring gaskets, valve seats, valve poppets, springs, spring retainers and retaining rings.
   G) Check valve poppet for freedom of movement. Pull back the poppet until contact is made with the spring retainer and release.

CHART A		
VALVE SIZE	CONNECTOR	STUD
6"	3/4 - 10 UNC 120 - 130 ft-lbs	1 - 8 UNC 50 ft-lbs

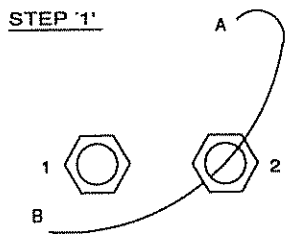


DETAIL 'B'

NOTE:

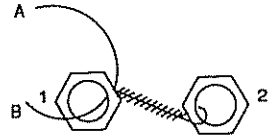
1. WIRE SHOULD BE TWISTED TIGHTLY AND WITHOUT SLACK. USE WIRE TWISTER PLIERS.

STEP '1'



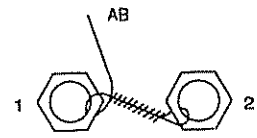
1. INSERT WIRE THROUGH CONNECTOR '2'

STEP '2'



1. TWIST 'A' & 'B'
2. INSERT 'B' THROUGH CONNECTOR '1'

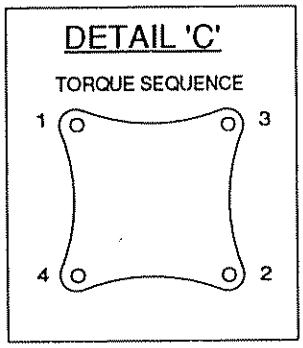
STEP '3'



1. TWIST 'A' & 'B'

2. Disassemble/Build the valve assembly as shown in the Valve Assembly Diagram.

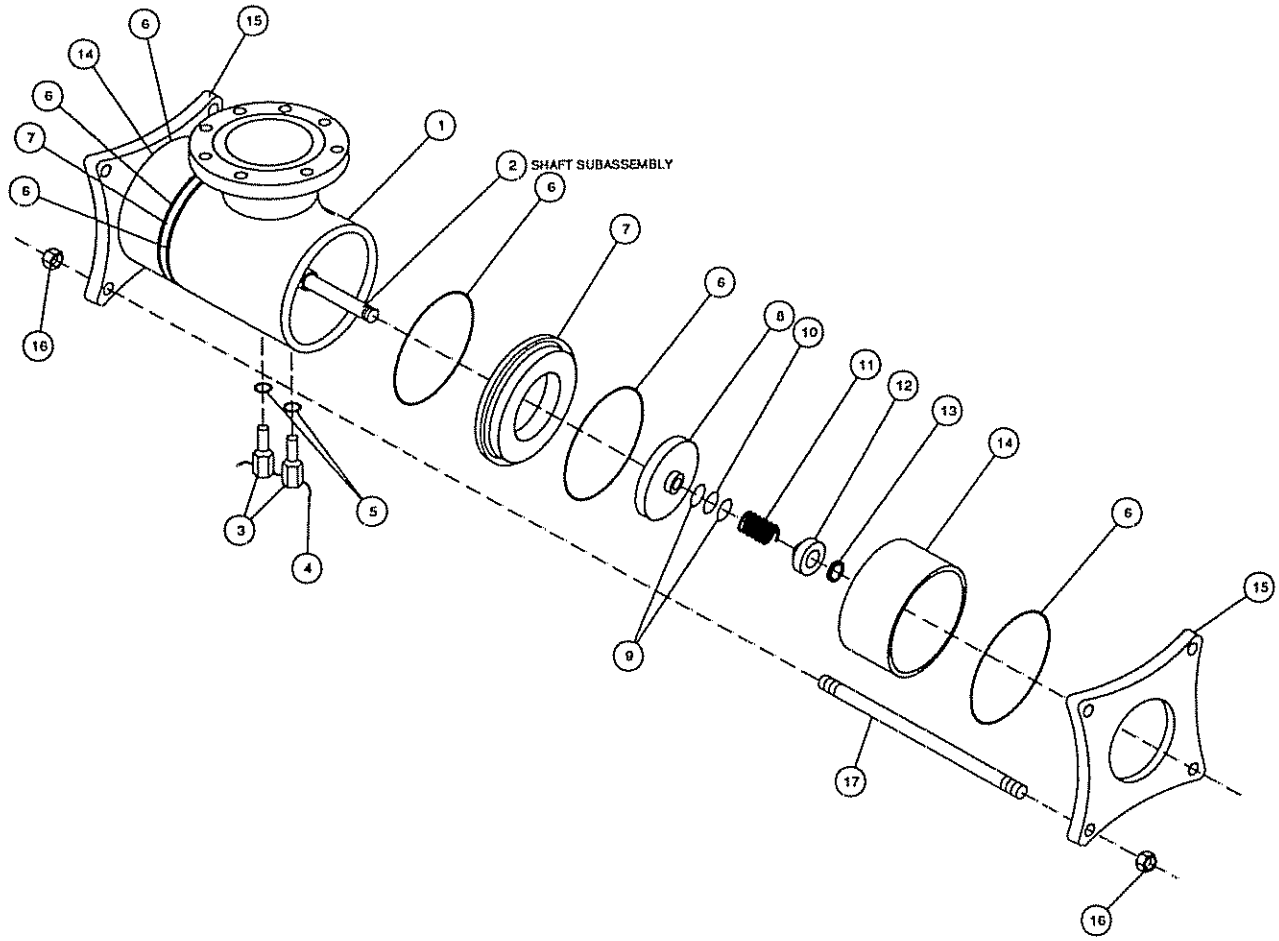
   A) Hand tighten studs in sequence shown in Detail C.
   B) Tighten studs in sequence shown to torque specified in Chart A.
   C) Leak check valve.



VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Shaft Subassembly	1	
3	Connector	2	
4	Lockwire (Connector)	1	A, B
5	O-Ring (Connector)	2	A, B
6	O-Ring	6	A, B
7	Valve Seat	2	B
8	Valve Poppet	2	A, B
9	Rod Scraper (Valve Poppet)	4	A, B
10	Guide Sleeve (Valve Poppet)	2	A, B
11	Compression Spring	2	A, B
12	Spring Retainer	2	A, B
13	Retaining Ring	2	A, B
14	Cylinder Bonnet	2	B
15	Valve Flange	2	
16	Hex Nut	8	
17	Threaded Stud	4	

*Remarks
A: Items included in 6" Purge Check Valve Repair Kit.
B: Items included in 6" Purge Check Valve Replacement Kit.

VALVE ASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY

1. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.

   Note: Spring washers must be oriented as shown in Detail D.

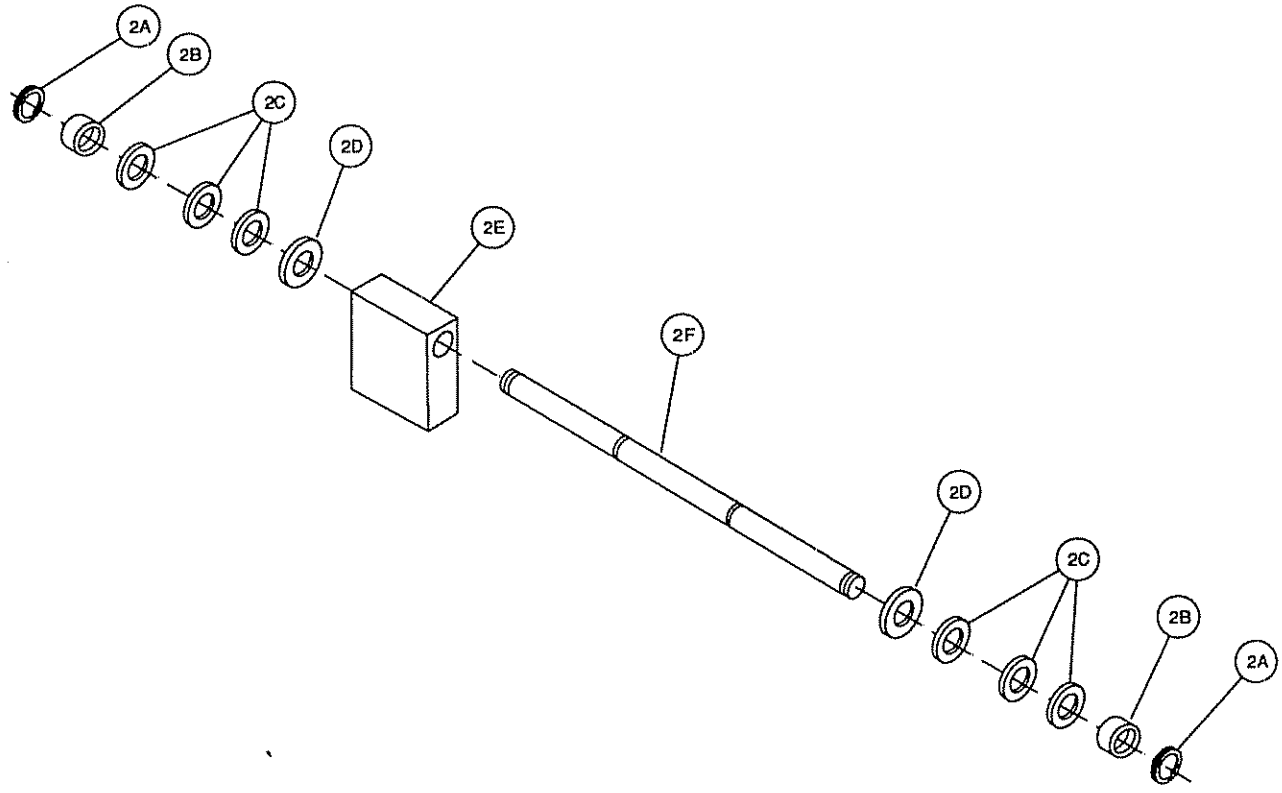
   A) Install the second retaining ring by compressing the assembly using a close fitting arbor, press as shown in Detail D.

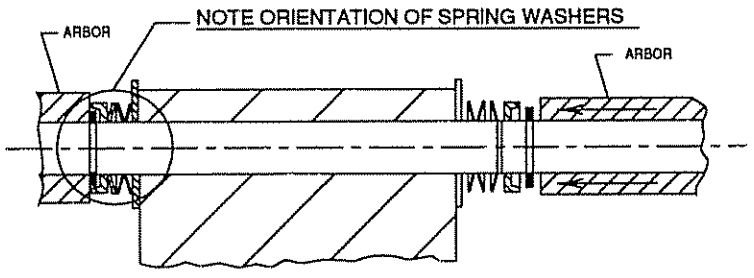
   Note: Disassembly of this component is not recommended if proper tools are not available for reassembly.

SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Retaining Ring	2	A, B
2B	Spring Retainer	2	A, B
2C	Spring Washer	6	A, B
2D	Plain Washer	2	A, B
2E	Support Block	1	B
2F	Poppet Shaft	1	B

*Remarks
A: Items included in 6" Purge Check Valve Repair Kit.
B: Items included in 6" Purge Check Valve Replacement Kit.

SHAFT SUBASSEMBLY





DETAIL 'D'

4.11 Check Valve Disassembly/Assembly For Dryer Models 10000 Through 12100

WARNING!
Ensure that the dryer and any associated prefilter and afterfilter are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Clean and inspect valve seats and poppets for damage and excessive wear. Use a mirror. Do not disassemble the valve at this time. Manually apply pressure to the poppets. If a tendency to bind or erratic operation is noted, disassemble and repair the valve.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Subassembly	1	
2	Rod Scraper (Valve Poppet)	4	B
3	Guide Sleeves (Valve Poppet)	4	A, B
4	Valve Poppet	2	
5	Compression Spring	2	A, B
6	Spring Retainer	2	B
7	Locknut	2	A, B
8	O-Ring	4	A, B
9	Bonnet Cylinder	2	B
10	Valve Flange	2	
11	Threaded Stud	4	
12	Hex Nut	8	

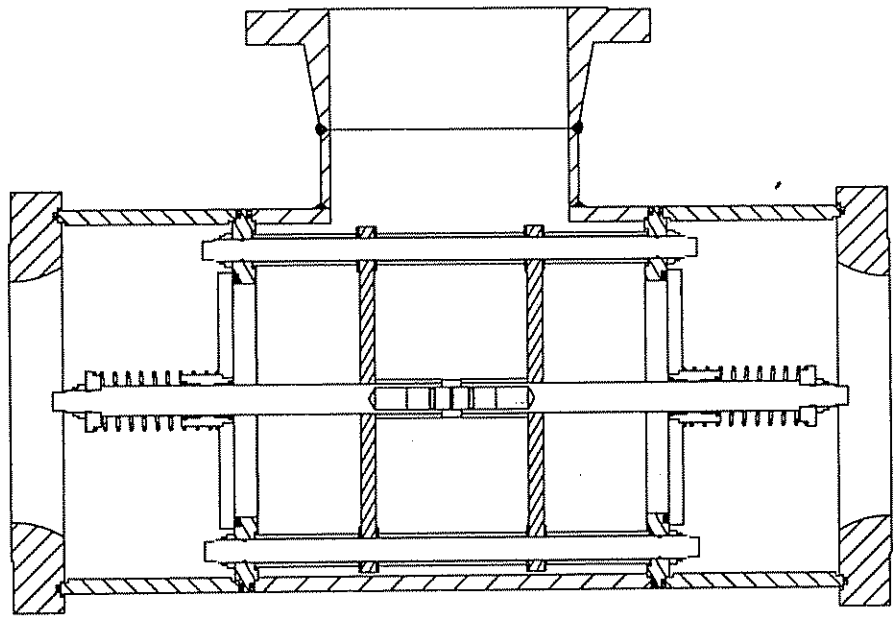
*Remarks
A: Items included in 8" Purge Check Valve Repair Kit.
B: Items included in 8" Purge Check Valve Replacement Kit.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

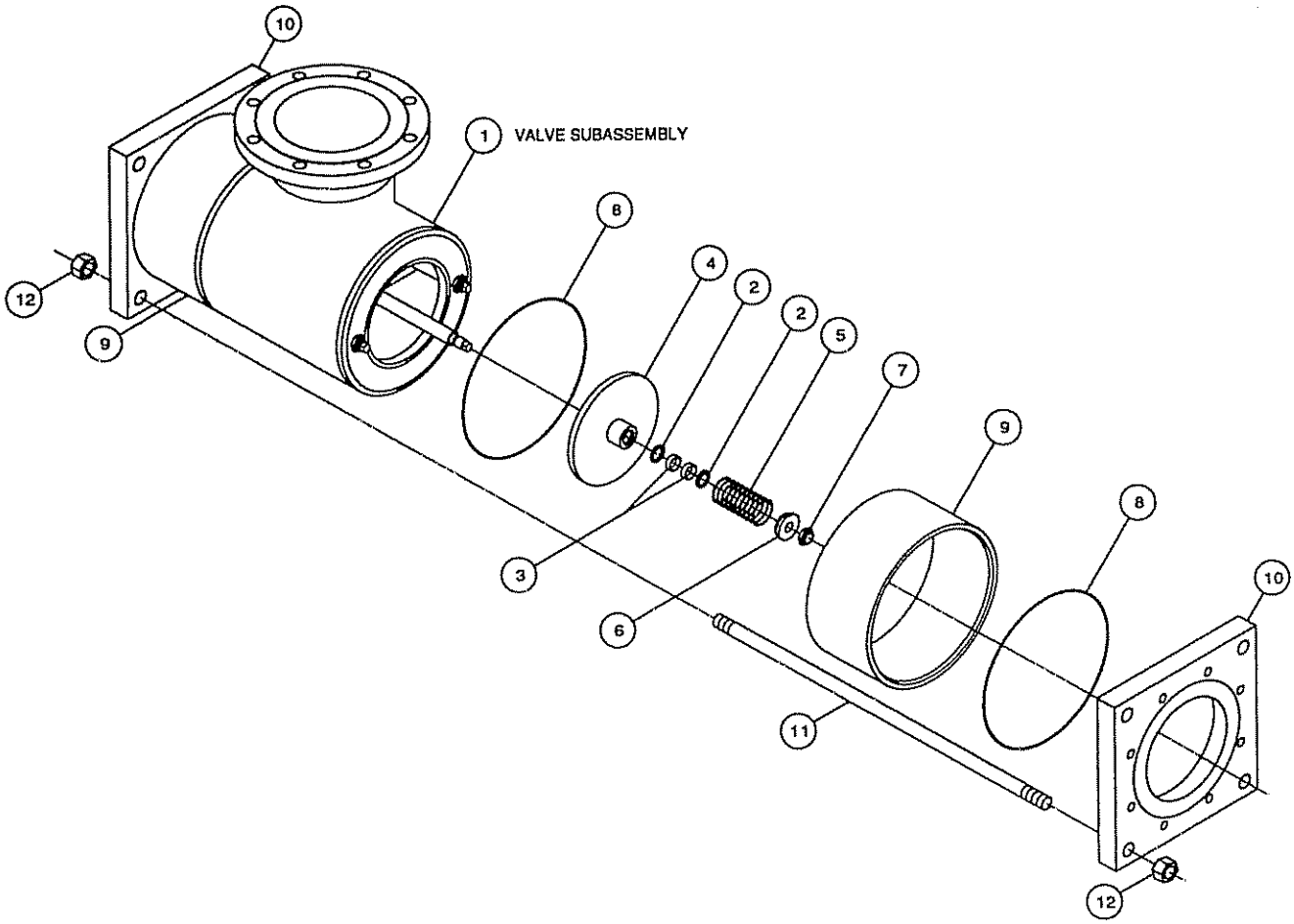
1. Disassemble/Build valve assembly in the order shown by the Valve Assembly Diagram.

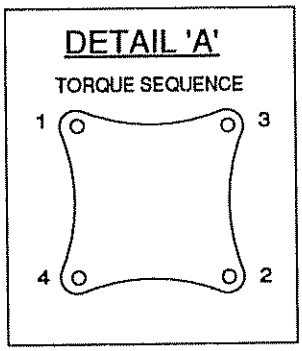
   A) Install rod scrapers and guide sleeves in poppets.
   B) Install valve poppets, springs, spring retainer, and torque locknuts.
   C) Install O-rings, valve bonnets, and flanges.
   D) Hand tighten studs in sequence shown in Detail A.
   E) Tighten studs in sequence to torque specified in Chart A.
   F) Check valve poppet for freedom of movement. Pull back the poppet until contact is made with the spring retainer and release.

CHART A		
VALVE SIZE	LOCKNUT	STUD
8"	3/4 - 16 UNF 110 - 120 ft-lbs	1 - 8 UNC 100 - 120 ft-lbs



VALVE ASSEMBLY





DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY

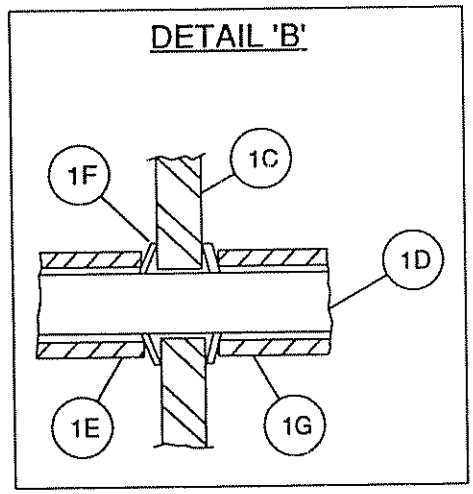
1. Disassemble/Build shaft subassembly in the order shown by the Shaft Subassembly Diagram.

   A) Clean and degrease all threads on the shaft and connector.
   B) Apply Loctite™ RC-620 to the threads of the connector, then assemble.

   Note: Loctite™ RC-620 must be applied to the connector to prevent valve failure.

SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
1A1	Connector	1	B
1A2	Spacer (Poppet Shaft)	1	B
1A3	Poppet Shaft	2	B

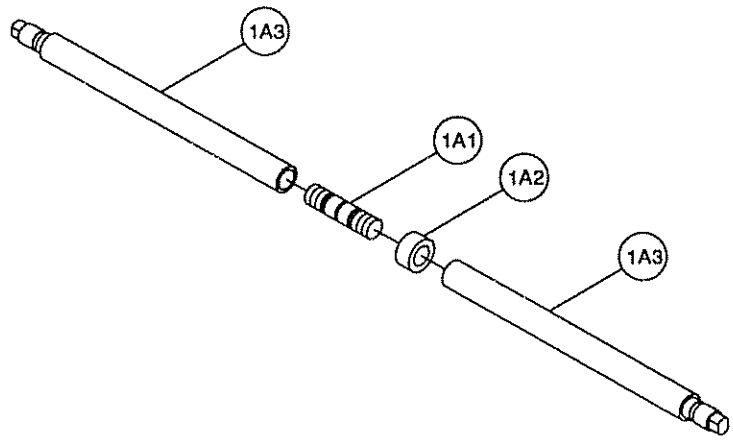
*Remarks
A: Items included in 8" Purge Check Valve Repair Kit.
B: Items included in 8" Purge Check Valve Replacement Kit.



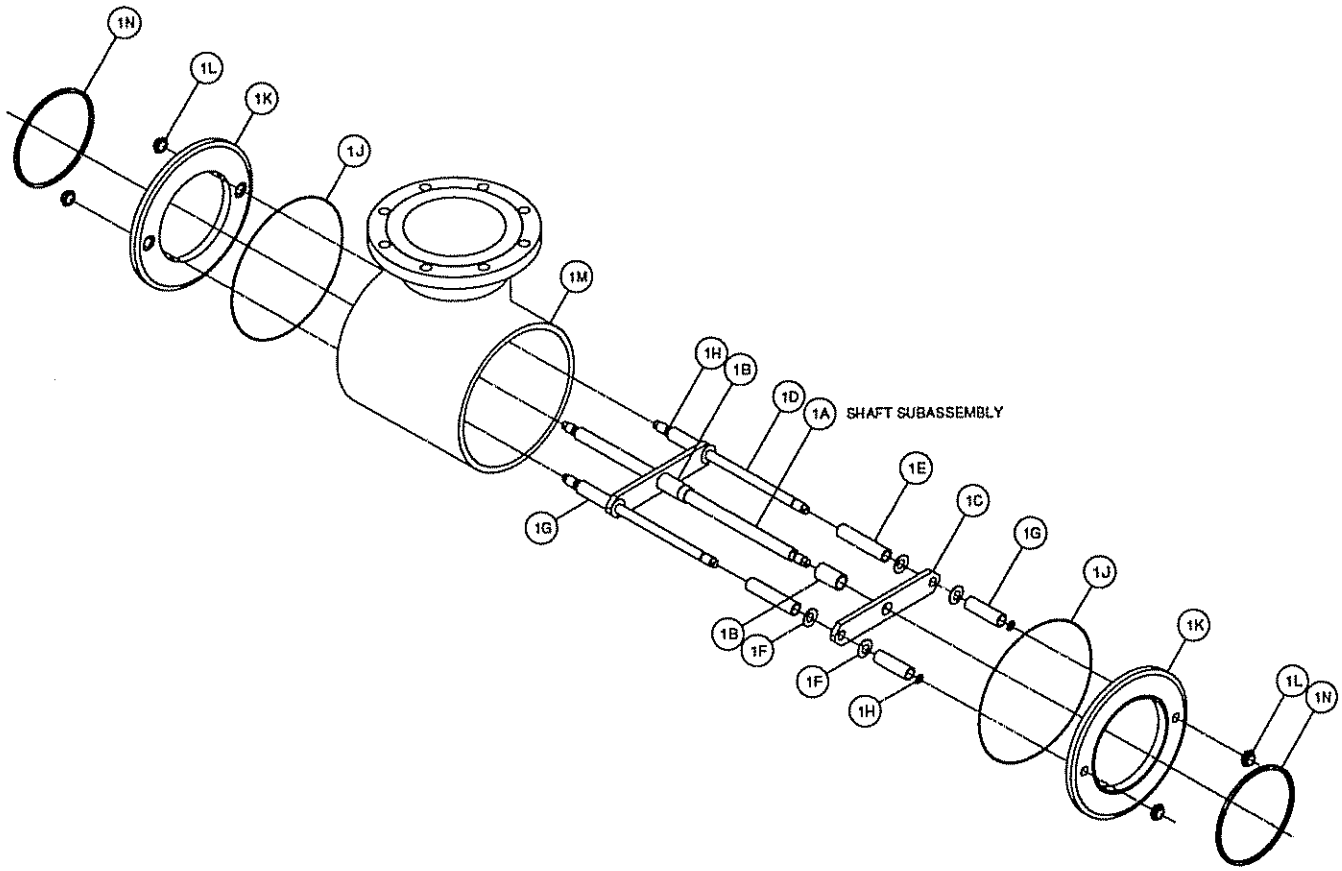
VALVE SUBASSEMBLY			
Item	Description	Total	*Remarks
1A	Shaft Subassembly	1	
1B	Spacer (Shaft Subassembly)	2	B
1C	Support Bracket	2	B
1D	Connectin Rod	2	B
1E	Spacer (Support Bracket)	2	B
1F	Spring Washer	8	A, B
1G	Spacer (Connecting Rod)	4	B
1H	O-Ring (Connecting Rod)	4	A, B
1J	O-Ring (Valve Seat)	2	A, B
1K	Valve Seat	2	
1L	Locknut	4	A, B
1M	Valve Body	1	
1N	O-Ring Material	2	

*Remarks
A: Items included in 8" Purge Check Valve Repair Kit.
B: Items included in 8" Purge Check Valve Replacement Kit.

SHAFT SUBASSEMBLY



VALVE SUBASSEMBLY



4.12 Flow Restrictor Disassembly/Assembly For Dryer Models 1600 Through 8100

WARNING!
Ensure that the dryer and any associated prefilters and afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Clean and inspect the assembly. Check operation of the assembly. If a tendency to bind, erratic operation, damage and/or excessive wear is noted, disassemble and repair the assembly.

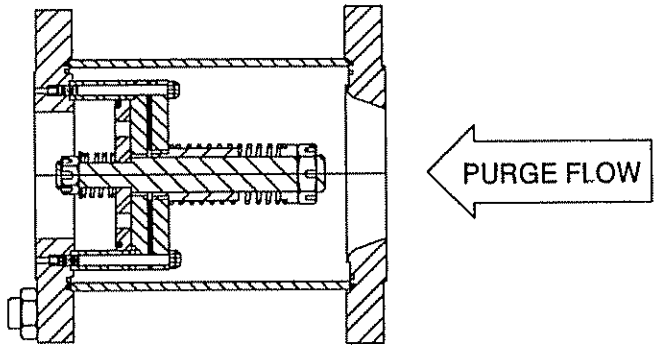
DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Build the flow restrictor assembly in the order shown by the Flow Restrictor Assembly Diagram.

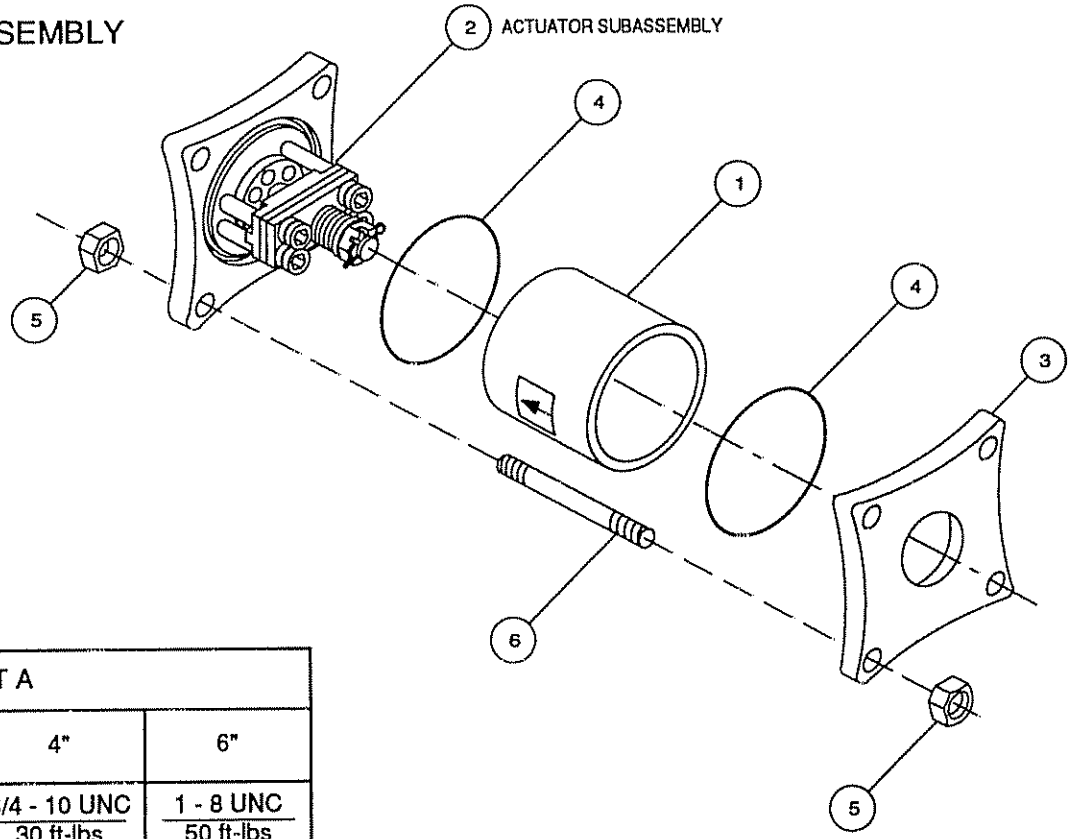
   A) Hand tighten studs in sequence shown in Detail A.
   B) Tighten studs in sequence shown to torque specified in Chart A.
   C) Leak check valve.

FLOW RESTRICTOR ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Actuator Subassembly	1	
3	Valve Flange	1	
4	O-Ring	2	A, B
5	Hex Nut	8	
6	Threaded Stud	4	

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.



FLOW RESTRICTOR ASSEMBLY



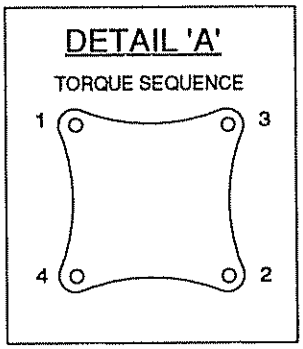
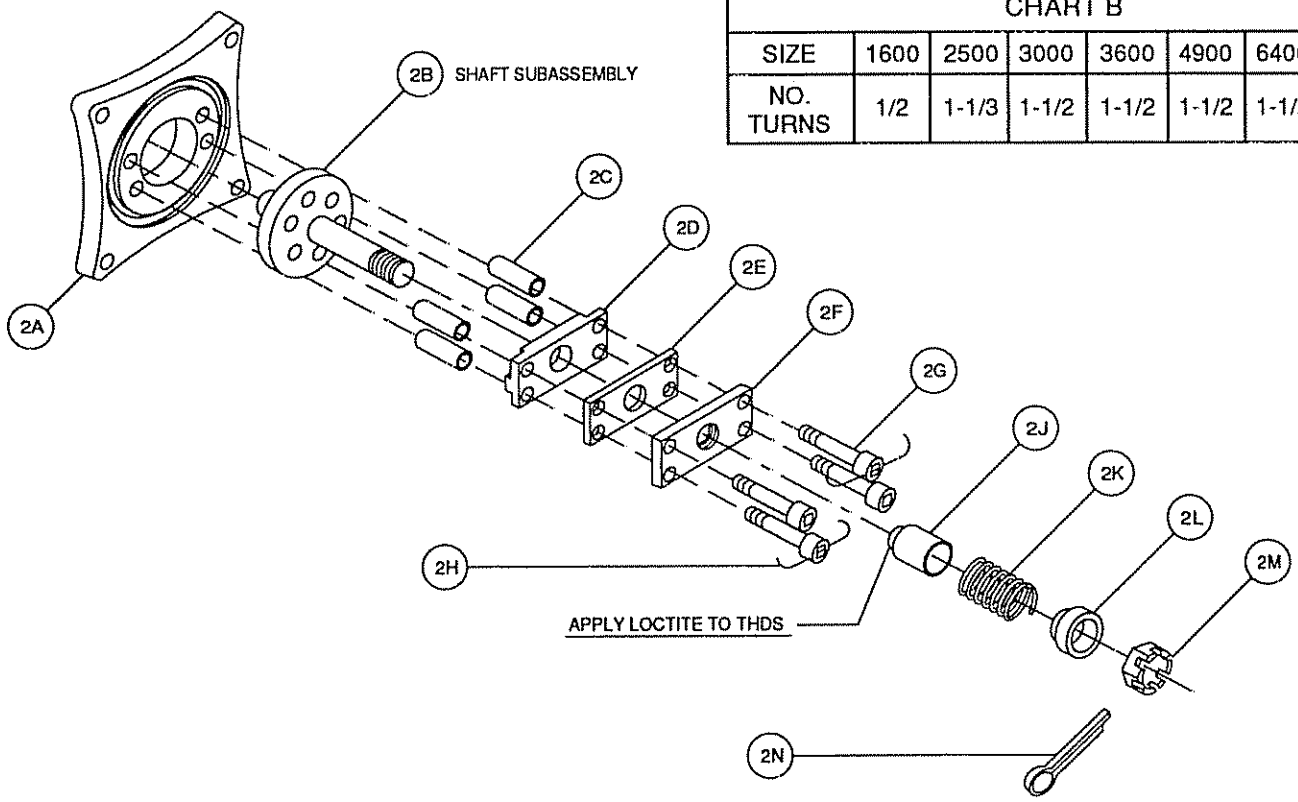


CHART A			
VALVE SIZE	3"	4"	6"
STUD	3/4 - 10 UNC / 30 ft-lbs	3/4 - 10 UNC / 30 ft-lbs	1 - 8 UNC / 50 ft-lbs

ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Valve Flange	1	
2B	Shaft Subassembly	1	
2C	Spacer	4	B
2D	Mounting Plate	1	B
2E	Vibration Pad	1	A, B
2F	Retaining Plate	1	B
2G	Sockethead Cap Screw	4	A, B
2H	Lockwire	1	
2J	Shaft Guide	1	B
2K	Compression Spring	1	A, B
2L	Spring Retainer	1	B
2M	Slotted Nut	1	A, B
2N	Cotter Pin	1	A, B

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.

ACTUATOR SUBASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

ACTUATOR SUBASSEMBLY

1. Disassemble/Build the actuator subassembly in the order shown by the Actuator Subassembly Diagram.

   A) Secure the retaining plate in the jaws of a vise.
   B) Apply Loctite™ RC-620 to the threads of the shaft guide and thread it into the retaining plate. Using a 1" combination wrench tighten with approximately 80-100 lbs. force.

   Note: Loctite™ RC-620 must be applied to the shaft guide to prevent loosening during operation.

   C) Tighten cap screws to 4-5 lbs. torque.
   D) Lockwire cap screws as shown in Detail B.

   Note: Correctly applied lockwire will tend to tighten both cap screws.

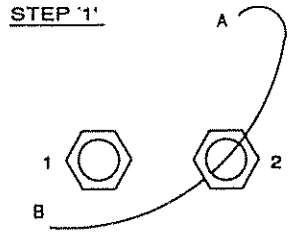
CHART B							
SIZE	1600	2500	3000	3600	4900	6400	8100
NO. TURNS	1/2	1-1/3	1-1/2	1-1/2	1-1/2	1-1/2	2

DETAIL 'B'

NOTE:

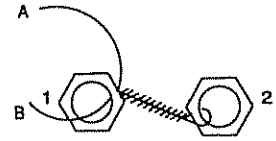
1. WIRE SHOULD BE TWISTED TIGHTLY AND WITHOUT SLACK. USE WIRE TWISTER PLIERS.

STEP '1'



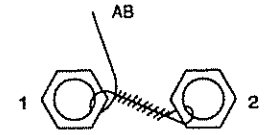
1. INSERT WIRE THROUGH CONNECTOR '2'

STEP '2'



1. TWIST 'A' & 'B'
2. INSERT 'B' THROUGH CONNECTOR '1'

STEP '3'



1. TWIST 'A' & 'B'

2. Adjust orifice stroke.

A) Invert the actuator subassembly and place in a vice as shown in Detail C.
B) Gently press the flange to the orifice.
C) Tighten the nut until the spring retainer slightly contacts the shaft guide.
D) Continue tightening the number of turns specified by Chart B.
E) Remove subassembly from the vice. Install the cotter pin.

Note: Orifice stroke adjustment is critical to the operation of the flow restrictor.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

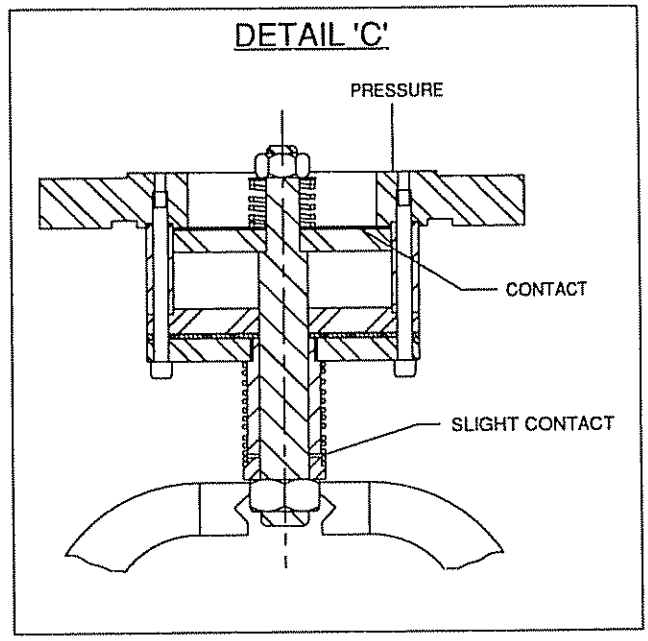
SHAFT SUBASSEMBLY

1. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.

2. Preload the orifice spring.

A) Tighten nut until slight contact is made with washer and orifice spring.
B) Continue tightening the number of turns specified by Chart C.
C) Install cotter pin.

Note: Preloading of the orifice spring is critical to the operation of the flow restrictor.



SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2B1	Poppet Shaft	1	B
2B2	Orifice Plate	1	A, B
2B3	Orifice Spring	1	A, B
2B4	Washer	1	A, B
2B5	Slotted Nut	1	A, B
2B6	Cotter Pin	1	A, B

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.

SHAFT SUBASSEMBLY

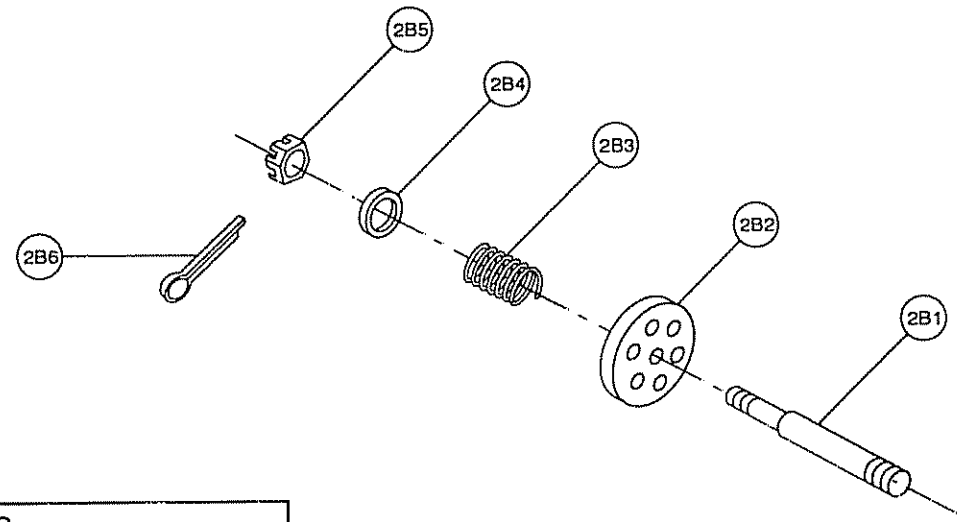


CHART C							
SIZE	1600	2500	3000	3600	4900	6400	8100
NO. TURNS	3	2-1/3	2-1/3	2-1/3	2	2	1

4.13 Flow Restrictor Disassembly/Assembly For Dryer Models 10000 Through 12100

WARNING!
Ensure that the dryer and any associated prefilter and afterfilter are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

1. Clean and inspect the assembly. Check operation of the assembly. If a tendency to bind, erratic operation, damage and/or excessive wear is noted, disassemble and repair the assembly.

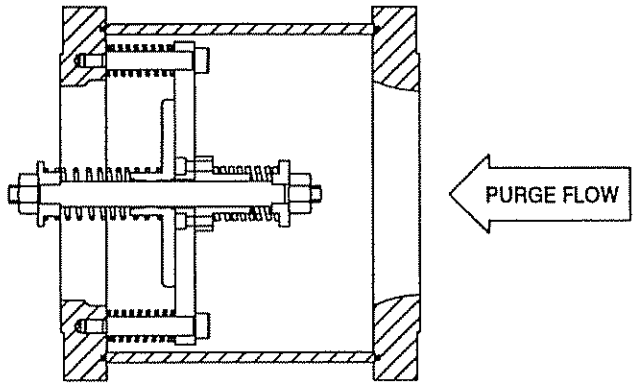
DISASSEMBLY/ASSEMBLY INSTRUCTIONS

1. Disassemble/Build the flow restrictor assembly in the order shown by the Flow Restrictor Assembly Diagram.

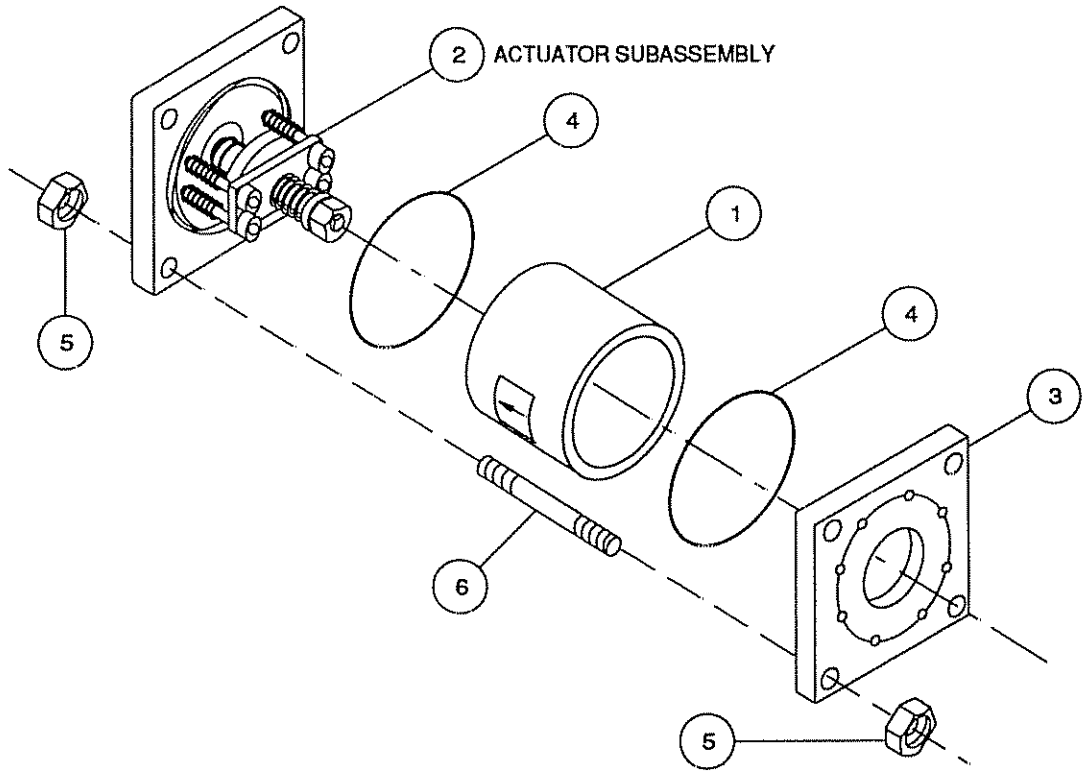
   A) Hand tighten studs in sequence shown in Detail A.
   B) Tighten studs in sequence shown to 80 to 100 ft-lbs. torque.
   C) Leak check valve.

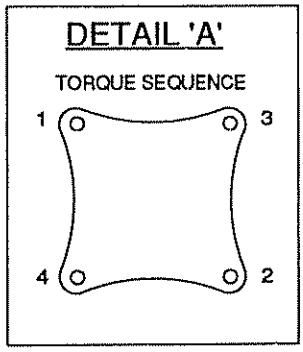
FLOW RESTRICTOR ASSEMBLY			
Item	Description	Total	*Remarks
1	Valve Body	1	
2	Actuator Subassembly	1	
3	Valve Flange	1	
4	O-Ring	2	A, B
5	Hex Nut	8	
6	Threaded Stud	4	

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.



FLOW RESTRICTOR ASSEMBLY





DISASSEMBLY/ASSEMBLY INSTRUCTIONS

ACTUATOR SUBASSEMBLY

1. Disassemble/Build the actuator subassembly in the order shown by the Actuator Subassembly Diagram.

   A) Apply Loctite™ RC-620 to the threads of socket head cap screws (2C) and assemble shaft guide (2B) to the support bracket (2A) as shown.

   Note: Loctite™ RC-620 must be used to prevent loosening during operation.

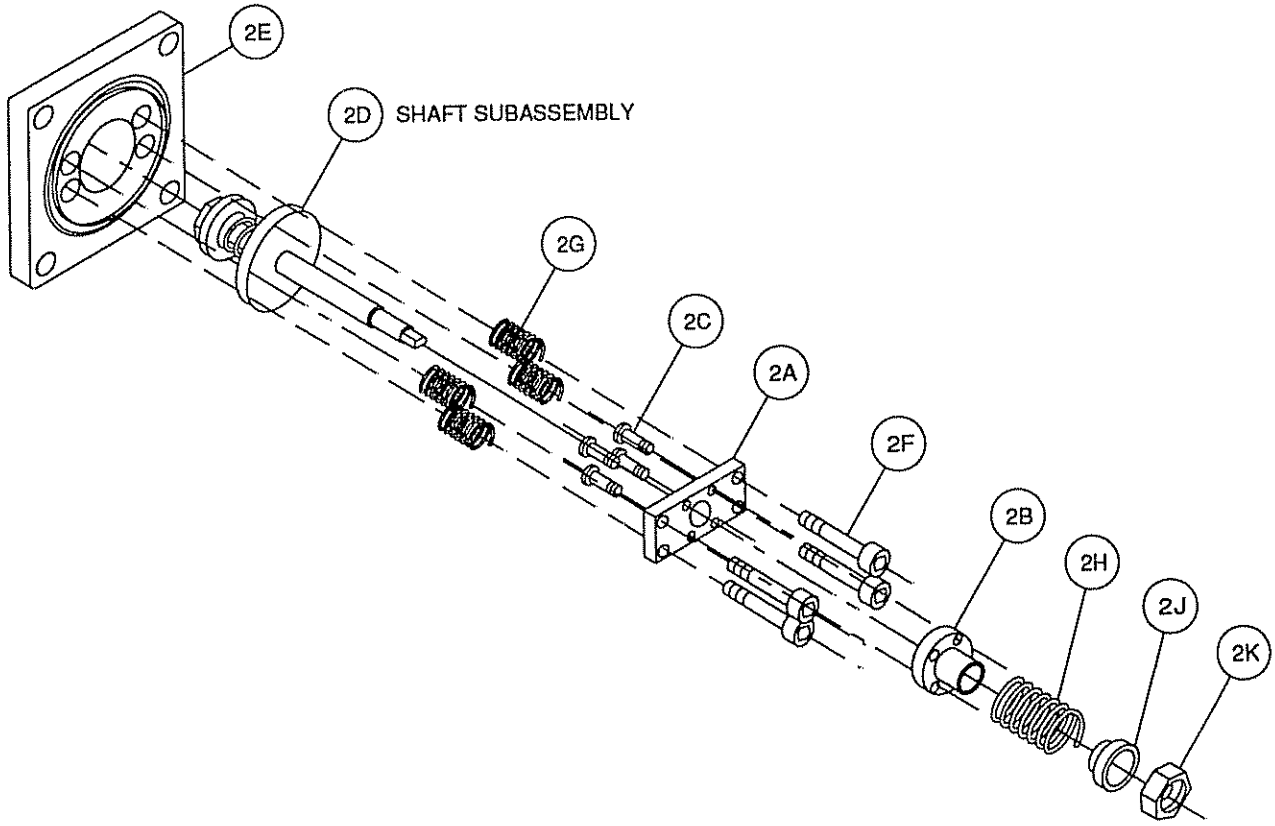
   B) Insert the shaft subassembly (2D) into the support bracket assembly.
   C) Apply Loctite™ RC-620 to the threads of the socket screws (2F) and mount the support bracket, shaft subassembly with support springs (2G) to the valve flanges (2E). Torque socket screws (2F) to 75 to 80 ft-lbs.
   D) Place shaft guide spring (2H) and spring retainer (2J) over the exposed end of the poppet shaft and assemble in place using locknut (2K). Torque locknuts to 110 to 120 ft-lbs.

   Note: Torque setting of locknuts is critical to the operation of the flow restrictor.

ACTUATOR SUBASSEMBLY			
Item	Description	Total	*Remarks
2A	Support Bracket	1	B
2B	Shaft Guide	1	B
2C	Sockethead Cap Screw	4	B
2D	Shaft Subassembly	1	
2E	Valve Flange	1	
2F	Socket Screw	4	A, B
2G	Support Spring	4	B
2H	Shaft Guide Spring	1	B
2J	Spring Retainer	1	B
2K	Locknut	1	A, B

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.

ACTUATOR SUBASSEMBLY



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

SHAFT SUBASSEMBLY

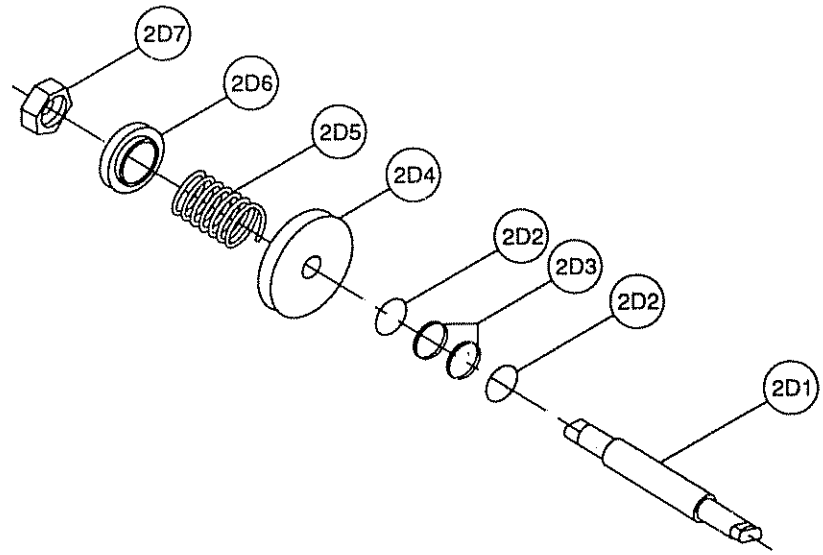
1. Disassemble/Build the shaft subassembly in the order shown by the Shaft Subassembly Diagram.

   A) Insert rod scrapers and guide sleeves into poppet valve.
   B) Assemble poppet valve, compression spring, spring retainer, and locknut on end of poppet shaft.
   C) Tighten the locknut until the spring retainer lightly contacts the poppet shaft.

SHAFT SUBASSEMBLY			
Item	Description	Total	*Remarks
2D1	Poppet Shaft	1	B
2D2	Rod Scraper	2	A, B
2D3	Guide Sleeves	2	A, B
2D4	Poppet Valve	1	B
2D5	Compression Spring	1	B
2D6	Spring Retainer	1	B
2D7	Locknut	1	A, B

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Replacement Kit.

SHAFT SUBASSEMBLY



4.14 Repressurization Valve Disassembly/Assembly For Dryer Models 1600 Through 3600

WARNING!
Ensure that the dryer is de-energized, valve isolated and fully depressurized before attempting to remove or disassemble any dryer related components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

Note: Removal of valve body [14] from dryer manifold is not required unless replacement of square o-rings [15] or valve body is necessary.

Note: Exploded view illustrates one-half of valve only. Disassembly of opposite half (not shown exploded), is identical.

1. Clean and inspect all valve hardware upon disassembly. Replace all software and any hardware which appears damaged or abnormally worn.

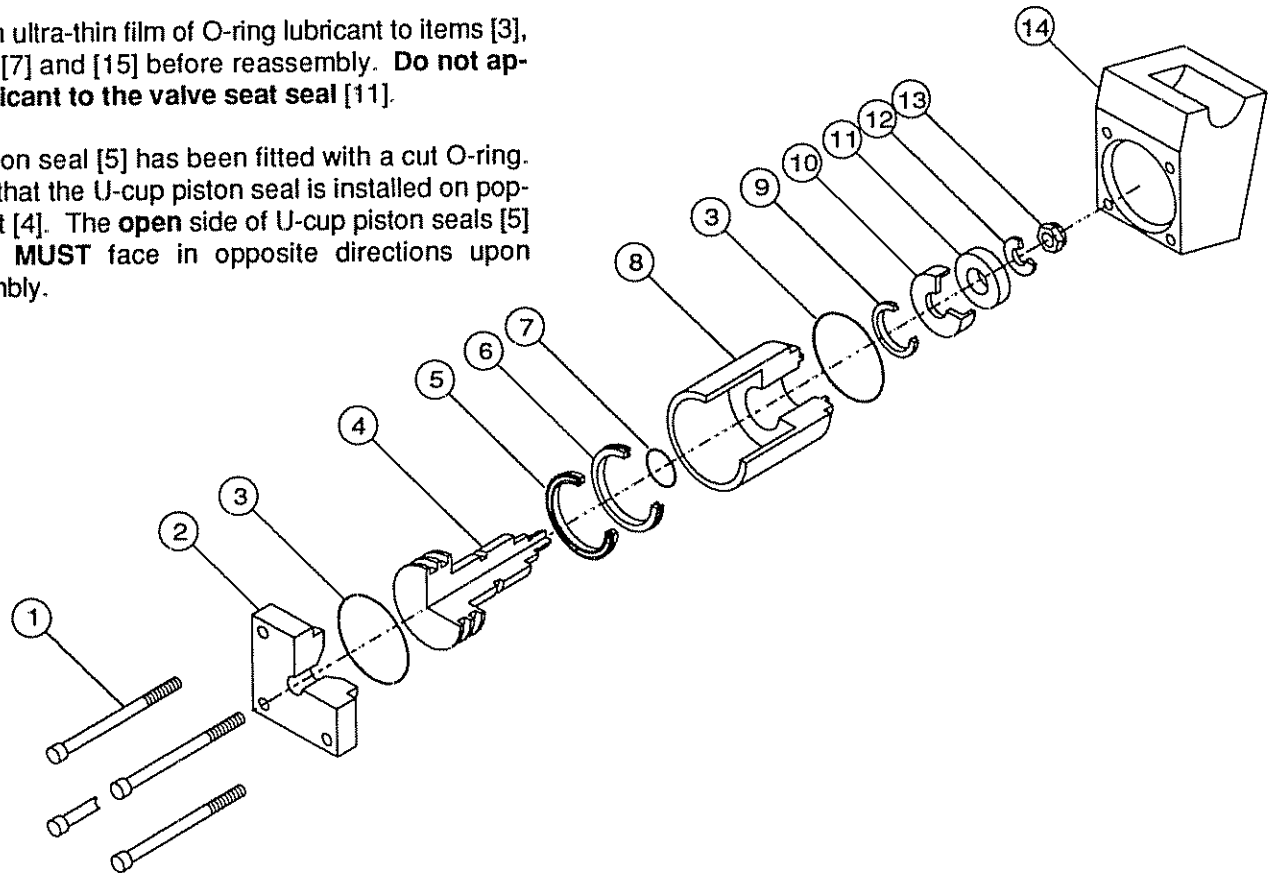
2. Clean and inspect valve seat located inside valve body [14]. As previously noted, this can be accomplished without removing the valve body [14] from the dryer manifold.

3. Apply an ultra-thin film of O-ring lubricant to items [3], [5], [6], [7] and [15] before reassembly. **Do not apply lubricant to the valve seat seal** [11].

4. The piston seal [5] has been fitted with a cut O-ring. Ensure that the U-cup piston seal is installed on poppet shaft [4]. The **open** side of U-cup piston seals [5] and [6] **MUST** face in opposite directions upon reassembly.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Sockethead Cap Screw	8	A
2	Valve Cover	2	
3	O-ring	4	A, B
4	Poppet Shaft	2	A
5	Piston Seal with O-ring	2	A, B
6	Piston Seal without O-ring	2	A, B
7	O-ring	2	A, B
8	Valve Bonnet	2	
9	Rod Scraper	2	A, B
10	Seal Retainer	2	A
11	Valve Seat Seal	2	A, B
12	Retaining Disk	2	A
13	Seal Nut	2	A
14	Valve Body	1	
15	Square O-ring	2	A, B
16	Sockethead Cap Screw	4	

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Packing Kit.



4.15 Repressurization Valve Disassembly/Assembly For Dryer Models 4900 Through 12100

WARNING!
Ensure that the dryer is de-energized, valve isolated and fully depressurized before attempting to remove or disassemble any dryer related components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

Note: Removal of valve body [17] from dryer manifold is not required unless replacement of square o-rings [18] or valve body is necessary.

Note: Exploded view illustrates one-half of valve only. Disassembly of opposite half (not shown exploded), is identical.

1. Clean and inspect all valve hardware upon disassembly. Replace all software and any hardware which appears damaged or abnormally worn.

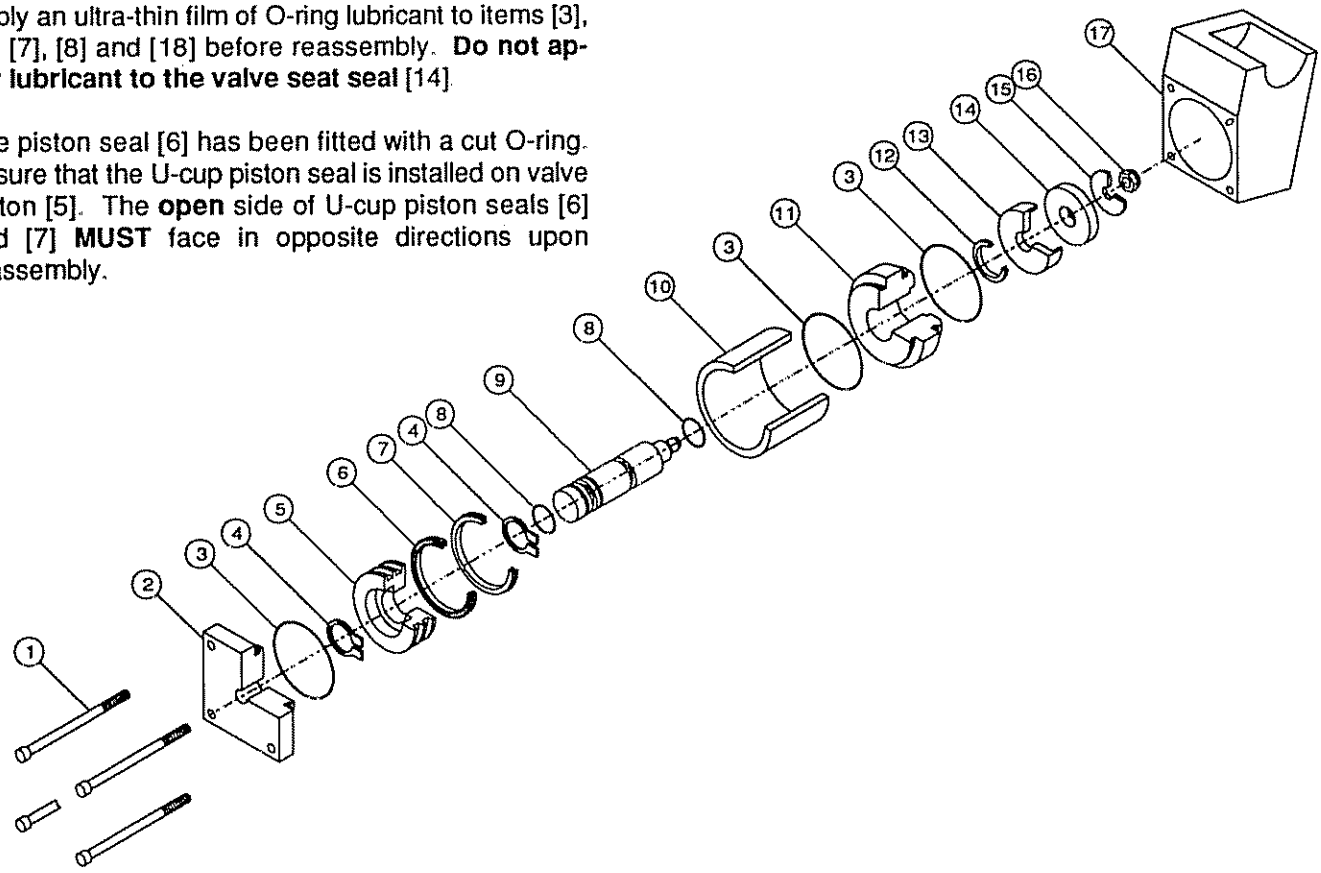
2. Clean and inspect valve seat located inside valve body [17]. As previously noted, this can be accomplished without removing the valve body [17] from the dryer manifold.

3. Apply an ultra-thin film of O-ring lubricant to items [3], [6], [7], [8] and [18] before reassembly. **Do not apply lubricant to the valve seat seal** [14].

4. The piston seal [6] has been fitted with a cut O-ring. Ensure that the U-cup piston seal is installed on valve piston [5]. The **open** side of U-cup piston seals [6] and [7] **MUST** face in opposite directions upon reassembly.

VALVE ASSEMBLY			
Item	Description	Total	*Remarks
1	Sockethead Cap Screw	8	A
2	Valve Cover	2	
3	O-ring	6	A, B
4	Retaining Ring	4	A
5	Valve Piston	2	A
6	Piston Seal with O-ring	2	A, B
7	Piston Seal without O-ring	2	A, B
8	O-ring	4	A, B
9	Poppet Shaft	2	A
10	Bonnet Cylinder	2	
11	Valve Bonnet	2	
12	Rod Scraper	2	A, B
13	Seal Retainer	2	A
14	Valve Seat Seal	2	A, B
15	Retaining Disc	2	A
16	Seal Nut	2	A, B
17	Valve Body	1	
18	Square O-ring	2	A, B
19	Sockethead Cap Screw	4	

*Remarks
A: Items included in Valve Repair Kit.
B: Items included in Valve Packing Kit.



4.16 Interface Valve Assembly/Disassembly

WARNING!
Ensure that the dryer is de-energized, valve isolated, and fully depressurized before attempting to remove or disassemble any dryer component or subassembly. Failure to do so may result in serious personal injury and/or equipment damage.

IMPORTANT: Do not attempt to remove Interface Valve Block [1] from Control Enclosure Cover. All component replacements must be accomplished with Valve Interface Block [1] left in place. Contact the Pneumatic Products Field Service Department for direction if replacement or removal of the entire block is required.

IMPORTANT: A special insertion tool is required for installation of actuating pistons [16]. DO NOT remove actuating pistons [16] from Interface Valve Block [1] unless this tool is available for reinstallation. Contact your local Pneumatic Products Sales Representative for ordering of insertion tool if original has been lost or damaged.

1. Hoses may be removed for easy access without removing hose connectors [6] from interface valve block [1]. To remove hoses depress the hose connector's plastic push-sleeve while simultaneously withdrawing hose. To reinstall, insert hose until it bottoms in hose connector.

2. Cartridge valves [15] should be carefully removed with standard internal retaining ring pliers. Actuating pistons [16] may be carefully removed with a 7/32 inch hex (allen) wrench.

3. Lubricate bores, actuating pistons and O-rings with a light film of silicone oil to prevent damage upon reassembly. **DO NOT USE O-RING LUBRICANT OR OTHER SIMILAR SOLID FILM GREASE.** Use the special insertion tool for installation of actuating pistons [16] as follows:

   a) Insert actuating piston [16] into insertion tool **FLARED END FIRST.**

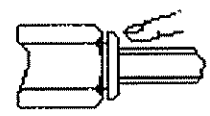
   b) Slide insertion tool (bevelled edge first) into bore until resistance is encountered.

   c) Using a blunt-edged object, push actuating piston through opposite end of insertion tool.

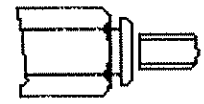
   d) Remove insertion tool and install remaining components [15], [14], [13], and [12] in the order shown.

INTERFACE VALVE ASSEMBLY		
Item	Description	Total
1	Interface Valve Block	1
2	O-ring	5
3	O-ring	5
4	3-way, Normally Closed Solenoid Valve	5
5	Seal	10
6	Hose Connector	10
7	O-ring	1
8	Pressure Sensor	1
9	O-ring	1
10	Pressure Sensor Mounting Block	1
11	Sockethead Cap Screw	2
12	Retaining Ring	5
13	End Plug	5
14	End Plug O-ring	5
15A	Cartridge Valve: Normally Open	2
15B	Cartridge Valve: Normally Closed	3
16	Actuating Piston	5
17	Regulator Inlet Assembly	1
18	Pilot Gas Regulator	1
19	Regulator Outlet Hose	1

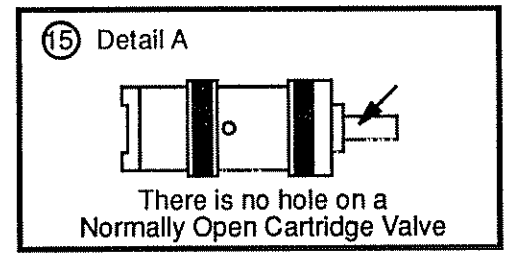
*Remarks
Items 4, 15 and 16 are available in Spare Parts Kits.

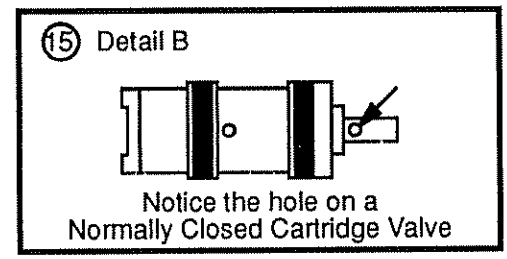


TO REMOVE TUBING, DEPRESS THE TUBE FITTING PLASTIC PUSH-SLEEVE WHILE SIMULTANEOUSLY WITHDRAWING TUBING.

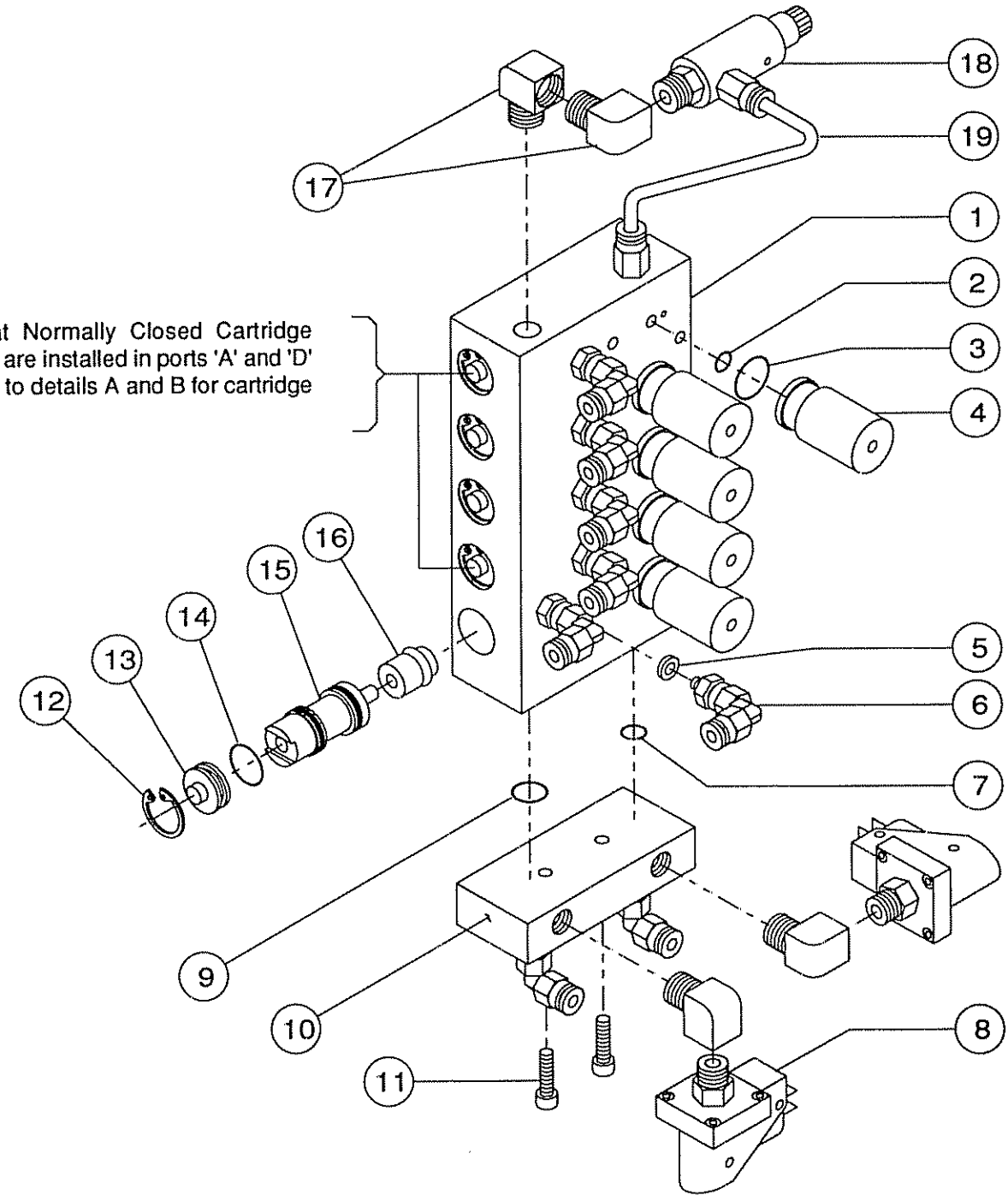


TO INSTALL, INSERT TUBING UNTIL IT BOTTOMS IN TUBE FITTING.





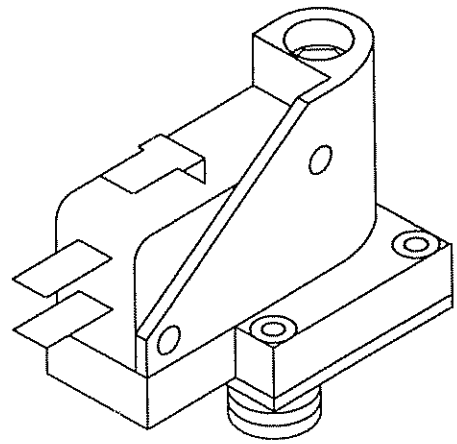
Ensure that Normally Closed Cartridge Valves (15) are installed in ports 'A' and 'D' only. Refer to details A and B for cartridge differences.



CAUTION: Install hose connectors [6] and solenoid valves [4] handtight, then apply an additional one quarter (1/4) turn **ONLY**. Further tightening can easily result in damaged or severed threads.

4.17 Valve Malfunction Alarm Pressure Sensor Disassembly and Replacement

A rugged, compact pressure control used to actuate alarms. Pressure settings are adjustable throughout range. Factory set at 45 psig unless special pressure conditions exist with your dryer.



ADJUSTMENT:

With an allen-type wrench, turn adjustment screw clockwise to raise pressure setting.

Every quarter (1/4) turn adjustment:

clockwise: increases the pressure setting a nominal 3psi.

counterclockwise: decreases the pressure setting a nominal 3 psi.

MATERIAL:

Body - Aluminum-zinc alloy.
Diaphragm - Polyurethane.

INSTALLATION:

Mount in any position via NPT pressure connection.

4.18 Amloc Probe Removal

WARNING!
Ensure that the dryer is de-energized, valve isolated and fully depressurized before attempting to remove or disassemble any dryer component or subassembly. Failure to do so may result in serious personal injury and or equipment damage.

1. To remove the Remote Sensor Assembly [3] proceed as follows:

   Note: The Remote Sensor Assembly [3] is **not** customer-serviceable, and must be replaced if found to be inoperative, or visibly damaged.

   a) Disconnect probe connector cable [2] by squeezing pin connector's "ribbed" area and simultaneously pulling downward.

   b) Remove screws [1] and nuts [5].

   c) Pull Remote Sensor Assembly [3] straight away from Amloc Probe's pin connectors.

   d) Inspect the Remote Sensor Assembly and Amloc Probe Pins (4) for damage and/or corrosion. Remove corrosion, or replace Remote Sensor Assembly and/or Amloc Probe if damage is noted.

   e) Install Remote Sensor Assembly in reverse order of removal if probe removal is not necessary.

2. To remove Amloc Probe from desiccant chamber proceed as follows:

   a) Remove probe's Remote Sensor Assembly [3], as instructed in step 1, sub-steps a through c.

   b) After dryer has been shutdown and fully depressurized, drain the subject chamber's desiccant charge.

   Note: If desiccant appears badly broken, or brown in color, replace with a new charge. Remedy cause of oil contamination and/or breakage.

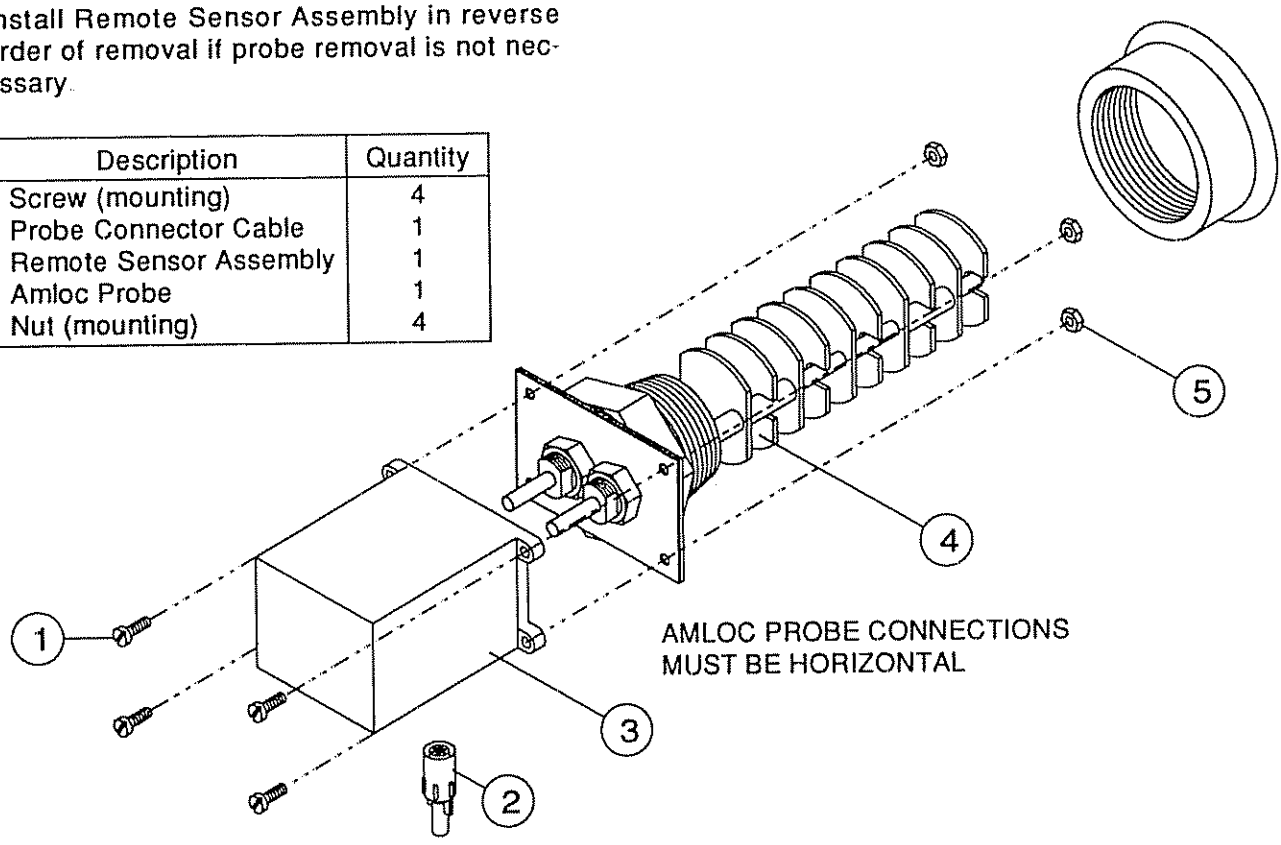
   CAUTION: Never attempt to remove, loosen or tighten an Amloc Probe which is installed in a desiccant filled chamber. Desiccant must first be drained to prevent Amloc Probe damage.

   c) Unscrew Amloc Probe [4] and remove from desiccant chamber. Install new probe if surface finish or ceramic spacer damage is noted upon inspection.

   d) Apply TFE tape to Amloc Probe threads.

   e) Replace desiccant as instructed in steps 9 and 10 of Section 4.2 reinstalling the Amloc Probe [5] as required.

Item	Description	Quantity
1	Screw (mounting)	4
2	Probe Connector Cable	1
3	Remote Sensor Assembly	1
4	Amloc Probe	1
5	Nut (mounting)	4



4.19 Pilot Gas Filter Disassembly

WARNING!
Ensure that the dryer is de-energized, valve isolated and fully depressurized before attempting to remove or disassemble any dryer component or subassembly. Failure to do so my result in serious personal injury and or equipment damage.

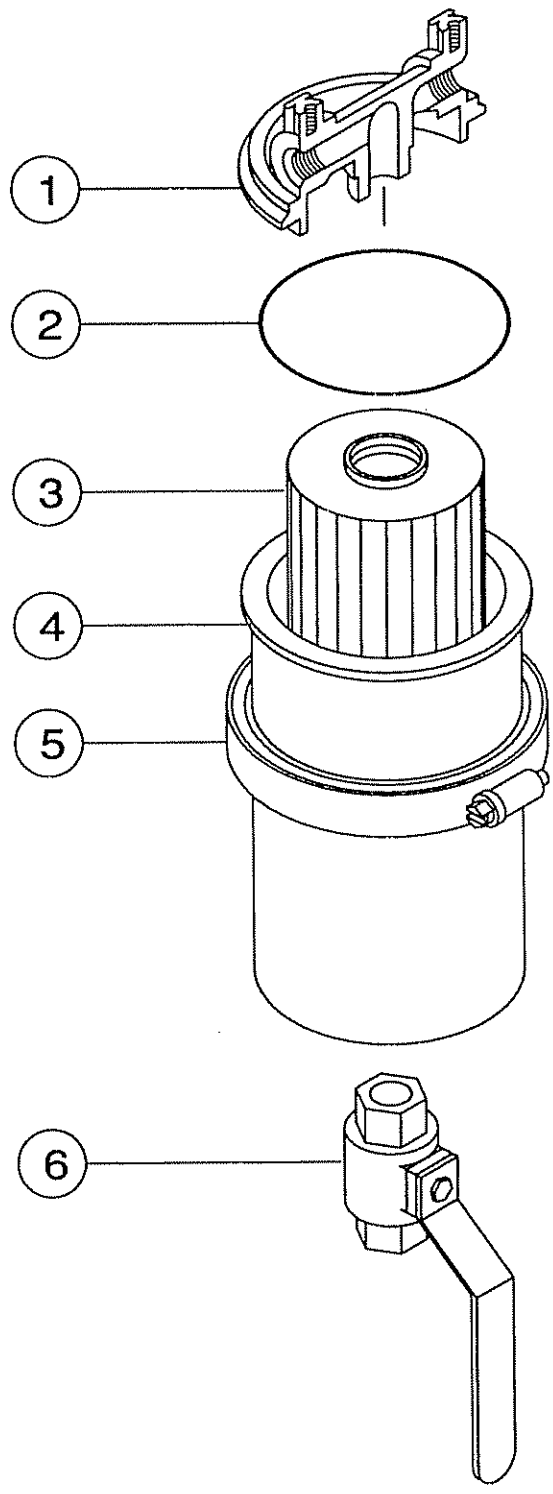
Note: Flow through the filter assembly is from the outside of the filter cartridge to the inside (center).

1. Clean and inspect all hardware upon disassembly. Replace the filter cartridge, software, and any hardware which appears damaged or abnormally worn.

2. Apply an ultra-thin film of O-ring lubricant to the filter cartridge's O-ring (4).

3. Close the filter bleed valve (6) following reassembly.

Item	Description	Quantity
1	Head Assembly	1
2	O-Ring	1
3	Filter Cartridge (non-cleanable)	1
4	Filter Bowl	1
5	Band Clamp	1
6	Filter Bleed Valve	1



5 Troubleshooting Guide

WARNING!
Ensure that the Dryer and any associated Prefilters and Afterfilters are valve isolated and fully depressurized before attempting to remove or disassemble any components or subassemblies. Failure to do so may result in serious personal injury and/or equipment damage.

WARNING!
Some of the following troubleshooting checks require entering the Dryer Control System enclosure while the Dryer's electrical power supply is energized. Therefore, a potential electrical shock hazard exists. These checks should be conducted by a qualified electrical technician or a Pneumatic Products Corporation Authorized Field Service Engineer ONLY. The Dryer's electrical power supply must be de-energized before any electrical maintenance or repair work is conducted.

CAUTION: Do not open or enter the Dryer Control System without exercising proper precautions for **Static Sensitive Devices. DO NOT** remove the factory programmed microcomputer chip or any I.C. chip from the Logic Control Circuit Board. Improper removal or handling will cause irreparable damage to these highly Static Sensitive Components. Damage to these components will render the Dryer Control System inoperative until replacement is accomplished by a Pneumatic Products Corporation Authorized Field Service Engineer. DO NOT remove the program identification sticker from the microcomputer chip.

IMPORTANT: Water molecules can diffuse through a pinhole size leak even though pressure inside the piping is several hundred PSIG. It is not at all uncommon to have a minute pinhole leak in a gas line cause an increase in dew point from -40°F to -10°F at a distance of forty or more feet downstream of the leak.

CAUTION: Do not change settings of dipswitches. Dipswitches are factory set to meet dryer design specifications. Improper dipswitch settings may cause the Dryer Control System to operate erratically, or malfunction. Contact your local Pneumatic Products Sales Representative to obtain the correct dipswitch settings for your dryer.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
Dew point degradation	1. Insufficient or excessive purge gas flow during regeneration.	1. Refer to the Calculation of Purge Pressure Setting instructions in Section 3.0. Ensure that the dryers purge flow has been properly calculated and adjusted.
	2. Inlet gas pressure is below the design pressure specified on the Dryer Specification & Performance Data Sheet.	2. Check the dryer's inlet pressure and correct if necessary. The efficiency of the dryer decreases as the inlet pressure decreases.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
Dew point degradation. — continued —	3. Inlet gas flow (scfm) is above the dryer's design flow rate.	3. Verify the actual flow rate through dryer. Reduce flow rate if operating above the inlet flow rate specified on the Dryer Specification & Performance Data Sheet.
	4. Inlet gas temperature is above the dryer's design inlet temperature specified on the Dryer Specification & Performance Data Sheet.	4. Check the compressor aftercooler and cooling system. Adjust as necessary to bring the dryer inlet temperature to design specification.
	5. Liquids entering the dryer inlet.	5. Isolate and Depressurize Prefilter Assembly. Inspect prefilter cartridges and end seals for loosening and/or damage. Tighten or replace as necessary. **CAUTION:** Each component of a Pneumatic Products Corporation Air Purification System has been selected to compliment the performance of the other components of the system. Therefore, use of unauthorized parts or supplies or improper operation will degrade system performance. 5a. Check the compressor aftercooler for tube leakage if the aftercooler uses water as the cooling medium. 5b. Inspect the prefilter automatic drain valve or drain trap. Ensure that it is not clogged, and is draining properly. Repair or replace as necessary, if a problem is noted.
	6. Desiccant is badly broken or coated with oil. The "normally white" desiccant will appear tan or brown if oil contamination has occurred.	6. **Shutdown and Depressurize Dryer.** Inspect desiccant through fill ports and replace if badly broken, coated with oil or otherwise fouled. Inspect prefilter if fouling is noted.
	7. Union or other piping/component leaks at dryer outlet manifold or downstream of dryer outlet.	7. Soap test the dryer outlet manifold and piping downstream of dryer. Repair ALL leaks noted.
AQUADEX Moisture Indicator has changed color from BLUE (dry) to a PINK (wet) indication.	1. Moisture indicator's bleed valve is closed.	1. Open bleed valve installed in moisture indicator body until a SLIGHT continuous gas bleed is felt exhausting from bleed valve's drilled exhau t port. Granular indicating desiccant MUST remain motionless after final adjustment.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
AQUADEX Moisture Indicator has changed color from BLUE (dry) to a PINK (wet) indication. — continued —	2. Moisture indicator supply valve is closed.	2. Fully open the moisture indicator supply valve. Adjust indicator's bleed valve as instructed in previous step 1.
	3. Moisture indicator is internally clogged, preventing gas from exiting through indicator's bleed valve.	3. Refer to Aquadex Moisture Indicator Recharging Procedure section of this manual for disassembly instructions. Clean or replace components as necessary.
	4. Sample tubing to Moisture Indicator is leaking permitting "wet" atmospheric air to enter tubing and contaminate dry gas sample.	4. Perform a soap bubble leak test on indicator's tubing and fittings. Tighten or repair all noted points-of-leakage.
	5. If the previous items 1 through 4 have been checked, and the Moisture Indicator fails to return to blue within 3 to 5 hours, an actual dew point problem may exist.	5. Refer to "Dew Point Degradation" section of this **Troubleshooting Guide**. Determine and eliminate fault.
	IMPORTANT: If granular indicating desiccant is discolored (any color other than light pink to dark blue, replace the granular indicator.	
Backpressure on a desiccant chamber during the regeneration cycle. (Chamber's pressure gauge indicates above zero (0) psig.) **Note:** The presence of backpressure will result in insufficient regeneration followed by dew point degradation. An off-stream chamber's pressure gauge MUST indicate zero (0) psig throughout all regeneration cycles.	1. Purge Adjusting Valve is supplying excessive purge gas to regenerating chamber as indicated by the Purge Pressure Indicator (gauge). **Note:** If correct setting is unknown, refer to the Calculation of Purge Pressure Setting instructions in Section 3.0.	1. **SLOWLY** rotate Purge Adjusting Valve until correct purge pressure setting is noted on the Purge Pressure Indicator. **Note:** The purge pressure setting can only be read and adjusted when the off-stream chamber has **depressurized** for regeneration. When the off-stream chamber is pressurized the Purge Pressure Indicator will read **system pressure**.
	2. Purge Check Valve seat is worn, damaged, or fouled (allowing slight pressure leakage to enter regenerating chamber).	2. **Shutdown and Depressurize Dryer.** Refer to the Purge Check Valve Disassembly Procedure which is applicable to your specific dryer model. Disassemble, clean and inspect the Purge and Check Valves. Replace all worn or damaged components as noted.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
Backpressure on a desiccant chamber during the regeneration cycle. — continued —	3. Off-stream chamber's Inlet/Outlet Switching Valve **or** on-stream chamber's Purge Exhaust Switching Valve seat is worn, damaged or fouled (allowing slight pressure leakage to enter regenerating chamber).	3. **Shutdown and Depressurize Dryer.** Refer to the Inlet/Outlet Switching Valve Disassembly and Purge Exhaust Switching Valve Disassembly Procedures which are applicable to your specific dryer model. Disassemble, clean and inspect the Inlet and Outlet Switching Valves and Purge Exhaust Switching Valves. Replace all worn or damaged components as noted.
	4. Repressurization Valve internals are worn, damaged or fouled (allowing slight pressure leakage to enter regenerating chamber).	4. **Shutdown and Depressurize Dryer.** Refer to the REPRESSURIZATION VALVE DISASSEMBLY PROCEDURE applicable to your specific dryer model. Disassemble, clean and inspect the Repressurization Valve. Replace all worn or damaged components as noted.
	5. Flow Restrictor internals are worn, damaged or fouled (creating backpressure on the regenerating chamber).	5. **Shutdown and Depressurize Dryer.** Refer to the Flow Restrictor Disassembly Procedure applicable to your specific dryer model. Disassemble, clean, inspect and replace worn or damaged components.
Chamber depressurization (prior to each regeneration cycle) is excessively loud.	1. The Purge Exhaust Flow Restrictor is damaged, or not fully seated.	1. **Shutdown and Depressurize Dryer**. Proceed as follows: **WARNING!** **Removal of the Flow Restrictor should not be done unless the piping to the Purge Exhaust Muffler is adequately supported. Failure to do so may result in serious personal injury and/or equipment damage.** a) Remove the Flow Restrictor from the line and refer to the Flow Restrictor Disassembly/ Assembly Procedure applicable to your specific dryer model. b) Disassemble, clean, inspect and adjust as required. Replace all worn or damaged parts as noted.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
Excessive pressure drop across dryer. **Note:** Refer to the Dryer Specification & Performance Data Sheet for your specific dryer model's maximum pressure drop (psid).	1. Inlet and/or outlet pressure gauges are out of calibration, or damaged.	1. **Shutdown and Depressurize Dryer.** Replace damaged, faulty or out of calibration gauges.
	2. Badly broken, dusted or fouled desiccant.	2. **Shutdown and Depressurize Dryer.** Inspect desiccant through fill ports and replace if badly broken, dusted or fouled. **Note:** If the "normally white" desiccant is fouled or discolored, inspect prefilter cartridges and drain valve or trap.
	3. Inlet flow rate (scfm) is exceeding the dryer's design flow rate as specified on the Dryer Specification & Performance Data Sheet.	3. Reduce the inlet flow rate as necessary to meet the dryer's design flow rate.
	4. Desiccant retaining screens are clogged or fouled.	4. **Shutdown and Depressurize Dryer.** Remove desiccant retaining screens from each chamber's fill and drain ports and clean if fouling is noted. Investigate and remedy source of fouling. **CAUTION:** Removal of a drain port retaining screen will result in drainage of a chamber's desiccant charge. Desiccant may be reinstalled if it is not fouled or badly broken.
Loss of power to Operating Status and Alarm Indicators (no illumination). (Both chambers are at line pressure, as indicated by the left and right chamber pressure gauges.)	1. Loss of power supply to (or at) dryer's electrical disconnect switch, or breaker (customer supplied).	1. Check power disconnect switch (or breaker) CLOSED. If tripped breaker or blown fuse is noted, investigate and remedy cause.
	2. Loose connection(s) at customer power connections (L1, L2, GND).	2. **De-energize Dryer Power Supply.** Check power supply input wiring connections (L1, L2, GND).
	3. Control system's power fuse (F1) is blown.	3. **De-energize Dryer Power Supply.** Replace fuse if blown, investigate and remedy cause.
	4. Damaged component(s).	4. For damaged solid state components and/or circuit boards, contact your local Pneumatic Products Corporation Sales Representative for assistance.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
INLET VALVE MALFUNCTION ALARM with excessive pressure exhausting through muffler. BOTH chamber pressure gauges read below normal system pressure. **Note:** This alarm indication may be accompanied by an EXHAUST VALVE MALFUNCTION ALARM if on-stream desiccant chamber's pressure has dropped below pressure switch's high setpoint.	1. Off-stream chamber's Inlet Switching Valve has failed to close due to fouled or worn valve internals.	1. Check for pilot gas pressure at off-stream chamber inlet valve's pilot tubing connection. If pilot pressure is present, refer to the Inlet Switching Valve Disassembly Procedure which is applicable to your specific dryer model. Disassemble, clean and inspect the Inlet Switching Valve. Replace all worn or damaged parts as noted.
	2. Off-stream desiccant chamber's Inlet Switching Valve has failed to close due to a faulty Visual Indicator Circuit Board or Logic Control Circuit Board.	2. When dryer's indicator panel indicates LEFT CHAMBER DRYING: a 4.5 to 5.5 VDC signal must be present at Terminal Block TB3 located on the Visual Indicator Circuit Board. When dryer's indicator panel indicates RIGHT CHAMBER DRYING: a 4.5 to 5.5 VDC signal must be present at Terminal Block TB2 located on the Visual Indicator Circuit Board. If the previously specified voltage reading is not noted at the appropriate terminal block (TB2 or TB3): a printed circuit board related fault exists. Contact your local Pneumatic Products Corporation Sales Representative for direction.
	3. Off-stream desiccant chamber's Inlet Switching Valve has failed to close due to the associated solenoid valve's (B or C) failure to energize (open).	3. **Shutdown and Depressurize Dryer.** Remove suspect solenoid valve's wire leads from terminal block and remove (unscrew) solenoid valve assembly from interface valve block. Momentarily connect solenoid valve wire leads to a standard six (6) volt battery. When connected to the battery, the solenoid should energize as noted by a slight "click". If this is not noted, install a NEW solenoid valve assembly.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
INLET VALVE MALFUNCTION ALARM. — continued —	4. Off-stream chamber's Inlet Switching Valve has failed to close due to an abnormal locking or binding of the interface valve assembly's "normally closed" cartridge valve (B or C) in a continuously closed position.	4. **Shutdown and Depressurize Dryer.** Refer to Section 4.16 as a guide. Remove internals from Bore B or C, as is appropriate. Replace all worn or damaged components as noted.
	5. Purge Check Valve internals are worn, damaged or fouled, permitting "blow-by" of on-stream chamber's pressure (through faulty check valve) to the off-stream chamber.	5. **Shutdown and Depressurize Dryer.** Refer to the Purge Check Valve Disassembly Procedure which is applicable to your specific dryer model. Disassemble, clean and inspect the Purge and Outlet Check Valves. Replace all worn or damaged components as noted
	6. Damaged or out of calibration pressure sensor.	6. **Shutdown and Depressurize Dryer**. Clean and inspect pressure sensor. Replace if necessary.
EXHAUST VALVE MALFUNCTION ALARM with excessive pressure exhausting through the purge exhaust muffler. BOTH chamber pressure gauges read below normal system pressure. **Note:** This alarm indication may be accompanied by an INLET VALVE MALFUNCTION ALARM if on-stream desiccant chamber's pressure has dropped below pressure switch's high setpoint.	1. Purge Exhaust Valve has failed to close due to worn, damaged or fouled internals.	1. Check for pilot gas pressure at on-stream chamber exhaust valve's pilot tubing connection. If pilot pressure is present, refer to the Purge Exhaust Valve Disassembly Procedure which is applicable to your specific dryer model. Disassemble, clean and inspect the Purge Exhaust Valve. Replace all worn or damaged parts as noted.
	2. Purge Exhaust Valve has failed to close due to a faulty Visual Indicator Circuit Board or Logic Control Circuit Board.	2. When dryer's indicator panel indicates LEFT CHAMBER DRYING: a 4.5 to 5.5 VDC signal **must not** be present at Terminal Block TB1 located on the Visual Indicator Circuit Board. When dryer's indicator panel indicates RIGHT CHAMBER DRYING: a 4.5 to 5.5 VDC signal **must not** be present at Terminal Block TB4 located on the Visual Indicator Circuit Board. If a voltage reading is noted at the appropriate terminal blocks (TB1 or TB4): a printed circuit board related fault exists. Contact your local Pneumatic Products Corporation Sales Representative for direction.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
EXHAUST VALVE MALFUNCTION ALARM . — continued —	3. Purge Exhaust Valve has failed to close due to an abnormal locking or binding of the interface valve assembly's "normally open" cartridge valve (A or D) in a continuously closed position. 4. Purge Check Valve internals are worn, damaged or fouled, permitting "blow-by" of on-stream chamber's pressure (through faulty check valve) to the off-stream chamber. 5. Damaged or out of calibration pressure sensor.	3. **Shutdown and Depressurize Dryer.** Refer to Section 4.16 as a guide. Remove internals from Bore A or D, as is appropriate. Replace all worn or damaged components as noted. 4. **Shutdown and Depressurize Dryer.** Refer to the Purge Check Valve Disassembly Procedure which is applicable to your specific dryer model. Disassemble, clean and inspect the Purge Check Valves. Replace all worn or damaged components as noted. 5. **Shutdown and Depressurize Dryer.** Clean and inspect pressure sensor. Replace if necessary.
CHAMBER PERFORMANCE DEGRADING ALARM **Note:** A CHAMBER PERFORMANCE DEGRADING ALARM will ALWAYS cause an AMLOC control system to automatically shift to the FIXED CYCLE MODE of operation.	1. Amloc Probe has sensed a moisture overload condition within a desiccant bed due to the presence of one (or both) of the following conditions: 1a. Inlet flow rate (scfm) is above dryer's design inlet flow rate, as specified on the Dryer Specification and Performance Data Sheet. Excessive flow rates will result in excessive moisture loading of the desiccant beds. This overload condition would raise the Amloc Probe's moisture related frequency signal above the microcomputer's comparator set point range, and therefore, would be interpreted as a CHAMBER PERFORMANCE DEGRADING ALARM.	1a. Verify the actual inlet flow rate. Reduce flow rate if operating above the inlet flow rate specified on the Dryer Specification and Performance Data Sheet. The control system may take as long as twenty-four (24) hours to automatically de-energize the CHAMBER PERFORMANCE DEGRADING ALARM and shift to the AMLOC CYCLE MODE of dryer operation.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
CHAMBER PERFORMANCE DEGRADING ALARM — continued —	1b. Gas has been allowed to flow through dryer for an extended period of time with the dryer control system de-energized. When the control system is de-energized, one chamber is automatically placed on-stream and regeneration is not conducted. Without regeneration, the desiccant beds will eventually be overloaded with moisture. When the power supply was re-energized, the moisture-overload condition raised the Amloc Probe's moisture related frequency signal above the microcomputer's comparator setpoint range, and therefore, would be interpreted as a CHAMBER PERFORMANCE DEGRADING ALARM. 2. Bad or loose wire connection(s) at the Remote Sensor Assembly Terminal Block TB3 or a faulty Probe Connector Cable.	1b. Allow the dryer to remain energized and operating in the FIXED CYCLE MODE. The CHAMBER PERFORMANCE DEGRADING ALARM will de-energize (followed by the control system's return to the AMLOC CYCLE MODE) AFTER the excessive moisture-load has been purged from the desiccant beds. The control system may take as long as twenty-four (24) hours to automatically de-energize the CHAMBER PERFORMANCE DEGRADING ALARM and shift to the AMLOC CYCLE MODE. 2. **De-energize Power Supply.** Proceed as follows: a. Remove the Probe Connector Cable from Remote Sensor Assembly which is associated with the indicated alarm. (Squeeze the pin connector's "ribbed" area while CAREFULLY pulling downward.) b. Remove the subject Probe Connector Cable leads and "clear-wrapped" cable shielding from associated terminals on the Remote Sensor Assembly Terminal Block TB3. c. Check for continuity through each of the disconnected Probe Connector Cable's wire leads. Pin 6 - Red Lead Pin 5 - White Lead Pin 3 - Black Lead Pin 2 - Green Lead CENTER PIN - "clear-wrapped" cable shielding. d. Repair any loose wiring noted or replace Probe Connector Cable, if necessary. e. If continuity is noted through all wire leads, reconnect Probe Connector Cable to TB3 and the Remote Sensor Assembly.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
CHAMBER PERFORMANCE DEGRADING ALARM — continued —	3. Remote Sensor Assembly to Amloc Probe connectors have corroded.	3. **De-energize Power Supply.** Proceed as follows: a. Remove Remote Sensor Assembly's four (4) mounting screws and nuts. b. Pull Remote Sensor Assembly straight-away from its associated Probe. c. Inspect and clean Remote Sensor Assembly to Amloc Probe clip connectors. (Two pins on Amloc Probe and two connectors in Remote Sensor Assembly.) d. Reinstall Remote Sensor Assembly. Re-energize dryer's power supply and monitor dryer for at least ten (10) minutes to ensure that the alarm has cleared and does not reoccur. **Note:** Dryer will always revert to a LEFT CHAMBER DRYING status following any power supply interruption.
	4. Remote Sensor Assembly has failed on chamber of indicated probe malfunction.	4. **De-energize Power Supply.** Proceed as follows: a. Remove the left and right Probe Connector Cables from each Amloc Probe's Remote Sensor Assembly. (Squeeze pin connector's "ribbed" area and CAREFULLY pull downward.) b. Remove the four (4) mounting screws and nuts from each Remote Sensor Assembly. c. Pull each Remote Sensor Assembly straight out and away from its associated Amloc Probe. d. Reinstall Remote Sensor Assemblies on opposite Probes (Left Remote Sensor to right Probe and right Remote Sensor to left Probe). e. Connect the left Probe Connector Cable to what is now the left Remote Sensor; and the right Probe Connector Cable to what is now the Right Sensor Assembly.

PROBLEM	POSSIBLE CAUSE	CHECKS AND REMEDY
CHAMBER PERFORMANCE DEGRADING ALARM — continued —		f. Energize the dryer's power supply. **Note:** The dryer will always revert to a LEFT CHAMBER DRYING status following any power supply interruption. g. If the CHAMBER PERFORMANCE DEGRADING ALARM reoccurs on the opposite chamber, replace the faulty Remote Sensor Assembly installed on the probe which is presently indicating a CHAMBER PERFORMANCE DEGRADING ALARM.
	5. If alarm still exists after the previous CHECKS AND REMEDIES 1 through 4 have been completed AND the dryer is NOT being overloaded (excessive inlet flow rate which is exceeding the specified design flow rate), the malfunction is due to a faulty Visual Indicator Circuit Board, Logic Control Circuit Board, or a desiccant chamber-installed Amloc Probe.	5. Contact your local Pneumatic Products Corporation Sales Representative for direction or service BEFORE attempting to replace either printed circuit board, or Amloc Probe. **CAUTION:** Never attempt to remove, loosen or tighten an Amloc Probe which is installed in a desiccant filled chamber. Desiccant must first be drained to prevent probe damage.